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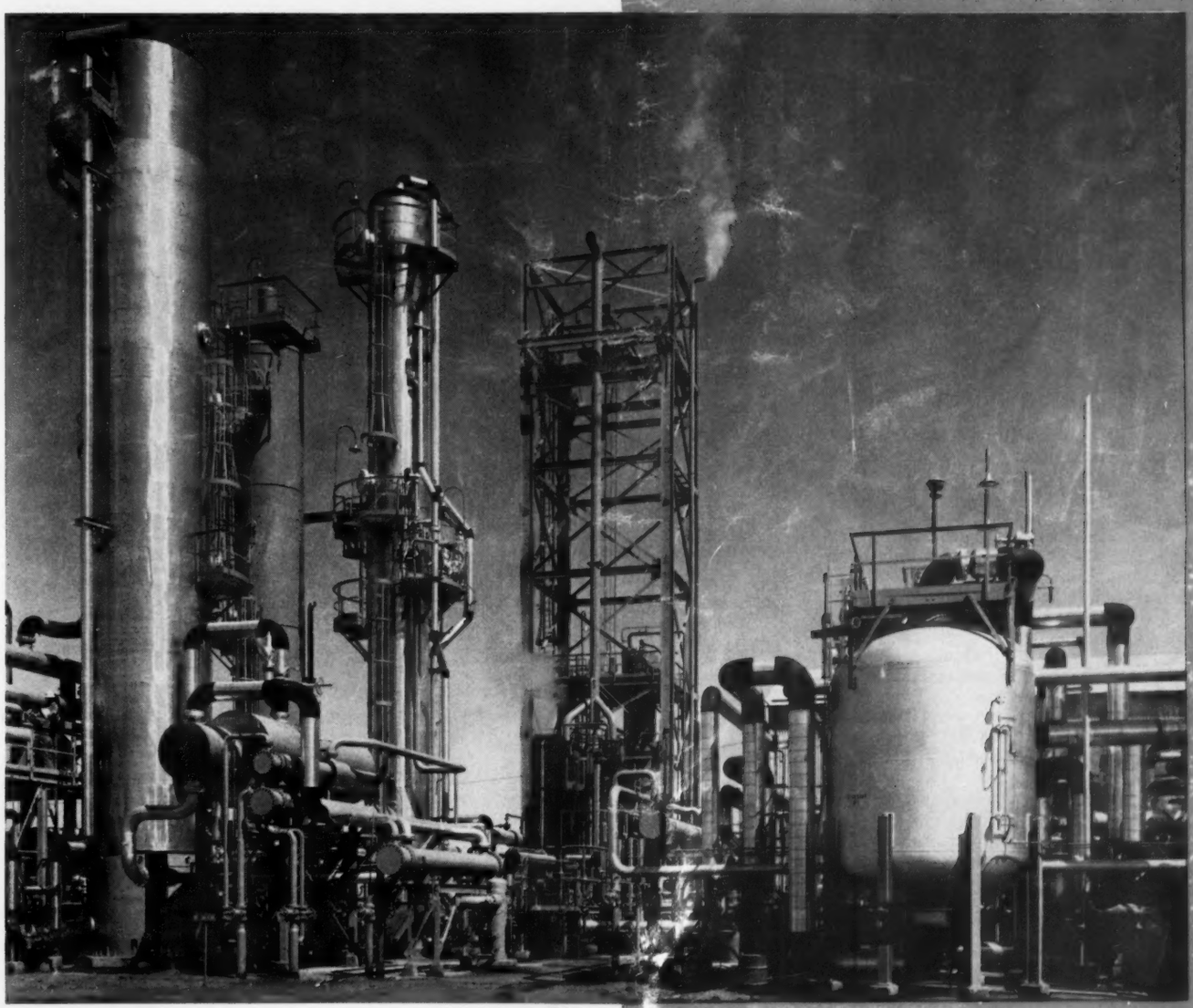
PRODUCTION EDITION

for Manufacturers of Chemicals for Agriculture



ABOVE—Ammonia plant of Valley Nitrogen Producers, Inc., Helm, California. Left to right: gas purification towers, ammonia synthesis tower and converter.

IN THIS ISSUE:

Georgia Pesticide Plant	2
Common-Sense Approach to Safety	4
Rauh Fertilizer Plant	7
Annual Safety Conference	8
Production Process Patents	9
Role of Crushing, Grinding Equipment	10
What's New	18
Editorials	26
Classified Advertising	27
Meeting Memos	27
Advertisers' Index	27

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Pesticide Production In Georgia Operation

A WELL-INTEGRATED pesticide manufacturing plant which has built up a sound reputation for itself over the years and in some dozen southeastern states where it does business—that's the story of Woolfolk Chemical Works, Ft. Valley, Ga., a half-century-old concern which began in 1910 to serve the peach growers of the area.

Woolfolk has now expanded its operations so that it has a group of seven production and formulating units grouped together at Ft. Valley to manufacture "Security Brand" products including rotenone, chlordane, BHC, sulphur dusts, DDT, lead arsenate, parathion, and toxaphene. These pest control products are used widely throughout the South, with company warehouses located at Jackson, Miss., and Nashville, Tenn., in addition to Ft. Valley, the home base.

In charge of operations at Ft. Valley are Jim Liipfert and Bill Liipfert III, and A. B. Young, general manager. The plant employs about 100 most of the time but, in rush seasons, the total reaches 150.

As is true with many forward-looking pesticide plants, Woolfolk maintains a fully-equipped laboratory and a full-time chemist in the person of Richard A. Dennis, who has been with the company nearly 3 years. Quality control of every item is strictly observed, with the laboratory playing a key role in this work.

In addition to the chemist, Woolfolk also maintains an entomologist, John C. Alden, who describes himself as a "trouble shooting technical assistant" who takes care not only of some of the pest control problems of customers, but also matters pertaining to proper registration of products and labeling.

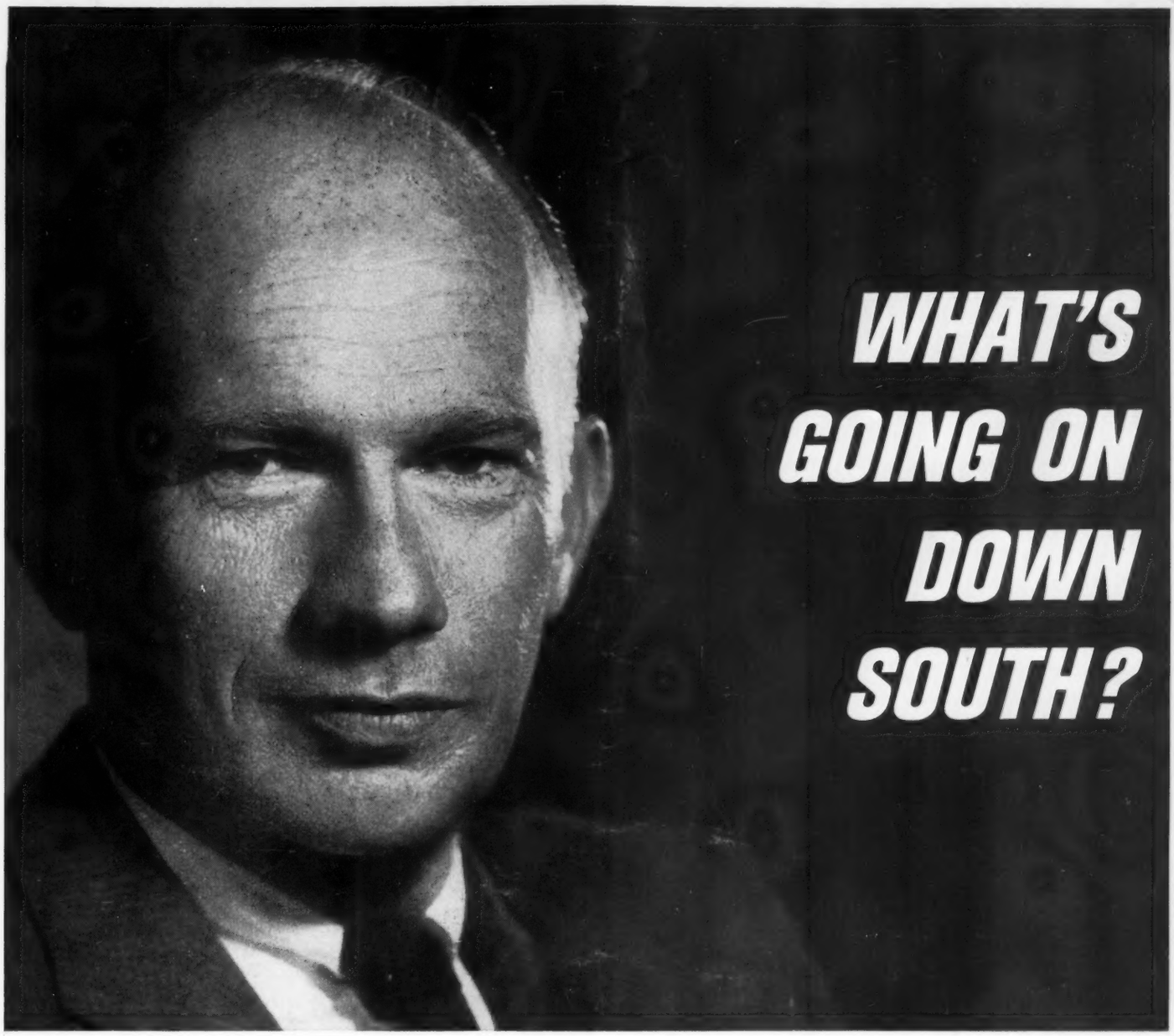
J. H. Thurman is production manager of the plant, which covers a number of acres at Ft. Valley. Both liquid and dry products are formulated at the plant, with emphasis placed on products used for pest control on peaches, cotton, and tobacco. According to Bill Liipfert, the largest volume of business is still directed toward control of peach pests.

The company has grown tremendously during its 49 years of existence, and the business continues to expand. Plans are now ready for enlarging the business office to provide more space for the accounting department. Additional personnel will also be added, Mr. Liipfert said.

PLANT SITE—Aerial view of Woolfolk Chemical Works, Ft. Valley, Ga., shows extent of building layout difficult to grasp from ground level. Lower center is office building, with manufacturing, storage, and shipping facilities in rear extending to upper right where new warehouse is situated.

At left is plant management team. Left to right, standing, are John Alden, entomologist, Bill Liipfert III, J. H. Thurman, production manager, Jim Liipfert, T. W. Cleveland, sales manager, and A. B. Young, general manager (seated). The brothers Liipfert are owners of the business.

UNLOADING LIQUIDS — Raw materials are brought into Woolfolk plant via truck and rail. Here tank truck unloads liquid insecticide material. Across bottom of page: scenes in packaging departments of small and large packages. Below at right, Richard A. Dennis, chemist, at work in his laboratory at the Woolfolk plant. Company checks samples of every batch.



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"More than 30 years ago, *Allied Chemical built one of the world's largest nitrogen plants in the South because of the promise of agricultural growth there. Since that time, The Progressive Farmer—our principal advertising medium—has helped to develop the rural South into our biggest market for ARCADIAN® Nitrogen Products. Our most recent development in fertilizer technology—ARCADIAN Liquid Nitrogen Solutions—was introduced to Southern farmers in The Progressive Farmer, and use of these Solutions is growing faster in the South than in the rest of the country."*

John D. Waugh, *Director of Advertising*
Nitrogen Division, Allied Chemical Corporation

Southern farmers know that fertilizer pays off BIG! Over the years, they've seen the increasing use of modern plant food practices spark higher and higher farm income. In 1958, the South's cash farm income went over $10 BILLION . . . with 1959 expected to top that!

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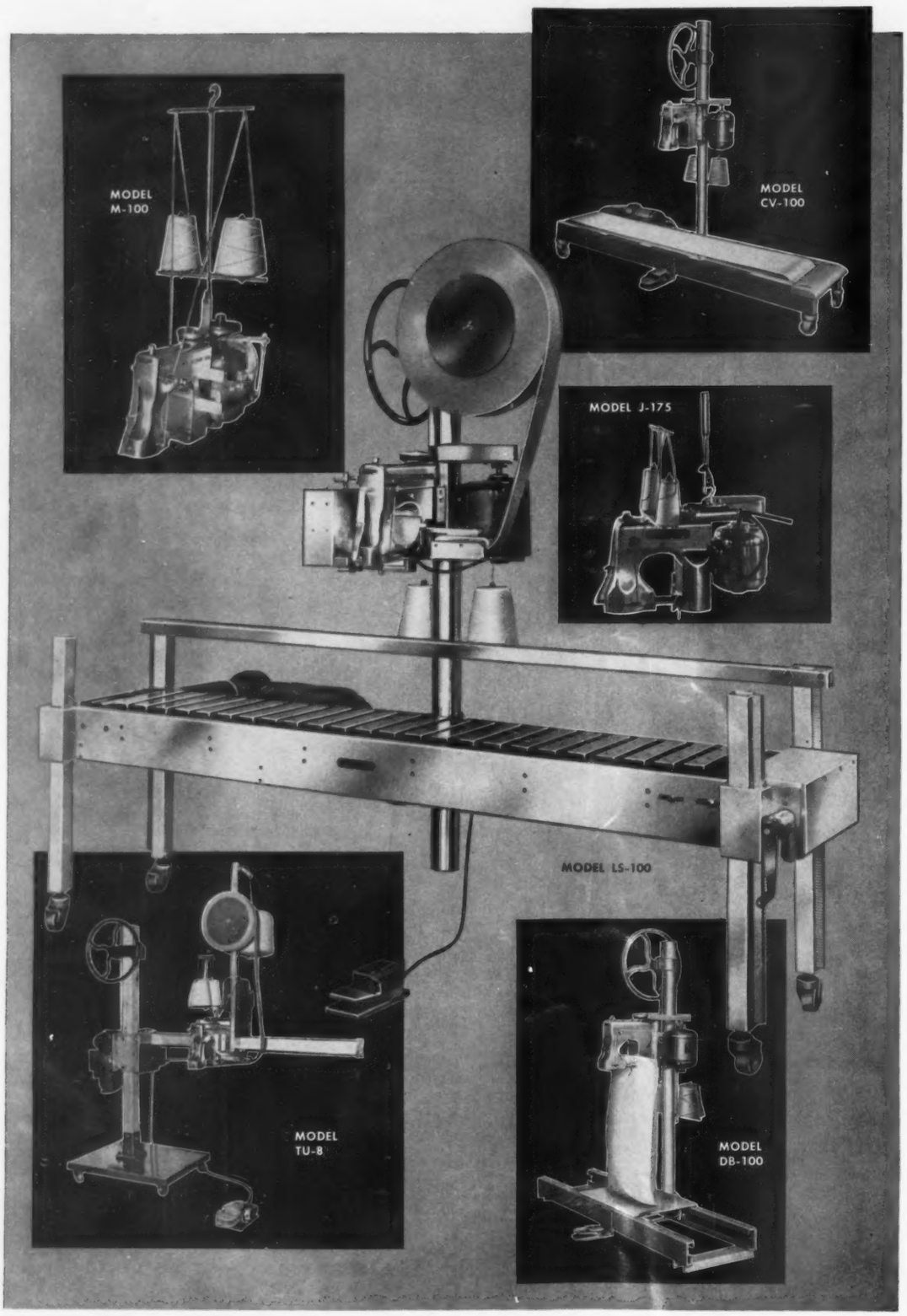

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Safety Based on Knowledge, Care And Common Sense

SAFETY SLOGANS and admonitions are constantly put before the eyes and ears of fertilizer production people, but sometimes they may wonder in what areas of work accidents are most likely to happen. It is a logical question, and has been answered in some detail by G. R. Mustaparta, Hercules Powder Co., Hercules, Cal., in a recent talk before an industry group. Here are some of the facts presented by Mr. Mustaparta:

About 24.4% of all compensable work injuries in the U.S. are due to manual handling of objects. In the State of California, 13.6% of all injuries reported are due to strain in lifting; 11.4% are due to being struck by an object in handling. Or to add them together, 25% or one-fourth of all disabling injuries are caused by handling materials.

What are material handling accidents like? Well, in 1957, in four out of every ten lost time injuries in California, an employee suffered a disabling strain, sprain, dislocation or hernia. The largest number of strains resulted from overexertions in lifting, pushing or carrying objects. Back strains alone accounted for two out of every ten disabilities occurring at work. Besides the trunk, the hands and feet are frequently involved in handling injuries.

Other facts about handling injuries in California in 1957: Some 2,739 disabling injuries because an employee dropped object while holding. Another 7,806 employees were injured otherwise in handling, 558 were injured by an object handled by another person, and 35,345 from strain or over-exertion. Of these 19,966 were from lifting or lowering, 2,782 from pushing or pulling, and 1,506 from holding or carrying.

Inhalation, absorption or swallowing caused 4,249 injuries, while sprains or strains were reported for 33,518 persons. There were 2,494 dislocations, 1,747 hernias and 13,472 other injuries due to over-exertion, sudden or awkward movement.

How does the fertilizer industry figure in the statistics? Since the fertilizer industry is so tied up with other industry it is difficult to get complete facts. The State of California, however, reports that disabling injuries reported by the fertilizer industry included two amputations, 12 burns and scalds, 8 cuts, lacerations, punctures, 32 strains, sprains, dislocations and hernias, 2 crushing, 13 fractures, 11 occupational disease, 8 bruises and contusions, 16 eye, 2 other injuries and 11 nature not reported.

Therefore, it appears the quickest way to get a reduction in injuries is to work on the causes of strains, sprains, dislocations and h e r n i a s which are usually caused by material handling.

Here are some of the rules for material handling:

1. Do not try to handle or lift too much. If you need help, ask for it.

2. Learn to lift properly. Always bend the knees, keep the back straight and bring the body up with the load. If the load cannot be lifted in this manner with reasonable ease, get help.

3. When two employees are carrying a load, one should not drop his end without first warning the other. When several workmen are lifting an object together, have an agreed signal to pick up or let down. Avoid placing a strain on one man or dropping a load on him.

4. Make sure there is adequate room and sufficient light to enable you to carry out the work safely.

5. Pile materials in a safe manner. Use care not to block exits, fire doors, aisles, sprinklers or fire fighting equipment.

6. If the work involves handling

harmful chemicals or rough heavy objects, wear suitable gloves, not forgetting protection of wrists.

7. All walkways, ramps, stairways and platforms must be kept clear of any objects that may cause a tripping hazard.

8. When using stairs, always try to keep one hand free to grasp the rail.

9. Do not trap yourself in corners so you will be unable to get out of the way if something should go wrong.

10. Wear safety shoes or protectors to guard your feet.

11. Bend over or remove all protruding nails in boards.

12. Set the brakes on railroad cars on all spurs. Also chock the wheels.

13. Do not climb over or around railroad cars in the yard when they are hooked to a locomotive.

14. Be sure there is adequate clearance between railroad cars and buildings or piles of material. (Standard is 4′ 8″ and 22′ overhead.)

15. If there is a proper machine to do the job, use it!

Some of the general rules for mechanical handling are:

1. Hand Trucks

Learn to balance the load and place it so it will stay on the truck, inspect the truck each day, keep the axles greased, and do not use nails for cotter pins on the axles.

Keep knuckles in the clear, do not leave trucks in the aisle, going down ramps, load should be ahead, and trucking plates, skids, etc., should be securely fastened.

2. Railroad Box Cars

Be sure brakes are set, wheels blocked and warning flags placed, open doors slowly to be sure nothing can fall out, make sure gang planks are firmly in place, and when done, remove blocks and flags.

3. Conveyors

Always wear safety shoes and close fitting clothing around conveyors. Inspect the mechanism to be sure that it is operating properly and see that all guards are in place.

See that the machine is properly grounded if electric driven, particularly when out of doors.

Do not oil or grease any parts in motion, and don't use hands to clear materials if conveyor is in motion. Keep tools and foreign materials away so they can't get into conveyor.

Install a "grizzly" over the hopper opening so no person can fall in or get caught.

4. Power Trucks

Check the trucks daily for condition. Start and stop slowly when raising, lowering or traveling. Pick up load in center of weight, and keep it below eye level. Tilt load back before moving and tilt to vertical before lowering.

Back down ramps and inclines to keep from spilling load. Never permit anyone to ride forks, load or on truck, and be sure to face direction of travel. Always keep load close to floor when traveling.

Do not operate unless qualified to run vehicle. Use good sense and do not use reverse for brake, and avoid being a "cowboy." Obey regular traffic rules.

The materials themselves offer peculiar hazards in the fertilizer manufacturing business. Because of their unusual properties, strict knowledge of how to handle them is absolutely essential for safety. Here are some reminders and cautions in working with anhydrous ammonia, aqua, ammonium nitrate. Although not new, these cautions can hardly be repeated too frequently.

Anhydrous Ammonia

It is flammable at high concentrations (16 to 25% by volume) and should be stored in dry and cool place.

Storage tanks should have two safety valves set at 225 p.s.i. All lighting, flashlights, etc., should be explosion proof, and tanks should be grounded.

Two proper safety masks should be available in case of emergency, as should fighting facilities.

In case of leaks, wash away with adequate volumes of water. Emergency clothing should be available, and safety showers and eye fountains should be adequate and strategically located.

Never use brass, bronze or copper valves or fittings.

(For additional information see Chemical Safety Data Sheet SD-8. Also see Anhydrous Ammonia safety special bulletin Agricultural Ammonia Institute.)

Ammonium Nitrate

The main problem with this product is its storage. Bags of ammonium nitrate should be stored not less than 30 in. from the storage building walls in piles not more than 12 feet in width, with 30 in. aisleways between piles. Bags should not be stored closer than 36 in. from the eaves of the roof or supporting and spreader beams overhead.

Turn to **SAFETY** page 24

WORKING SAFELY...

DAVISON Hi-Flo Gran-U-Lated Triple Superphosphate is unexcelled by any other

(S$_1$Q$_2$D$_2$TA$_1$) The Davison formula of properly proportioned parts of Service, Quality, Dependability, Delivery and Technical Assistance (S$_1$Q$_2$D$_2$TA$_1$) is as important to you in your choice of source as anything else we could name.

In every field, there is always one particular brand that is so outstanding that it is head and shoulders above the competition. That is true of Davison Hi-Flo Gran-U-Lated Triple Superphosphate. Here is the product that *is* the standard of comparison for all other granulated triples. Davison Gran-U-Lated Triple Superphosphate is uniform in particle size . . . dust free and will not break down or crumble in the bag. It is ideal for direct application or for formulation of dry materials. Most of all, with Davison Gran-U-Lated you are certain of constant uniformity . . . it is GUARANTEED 46% available P_2O_5 . . . every time.

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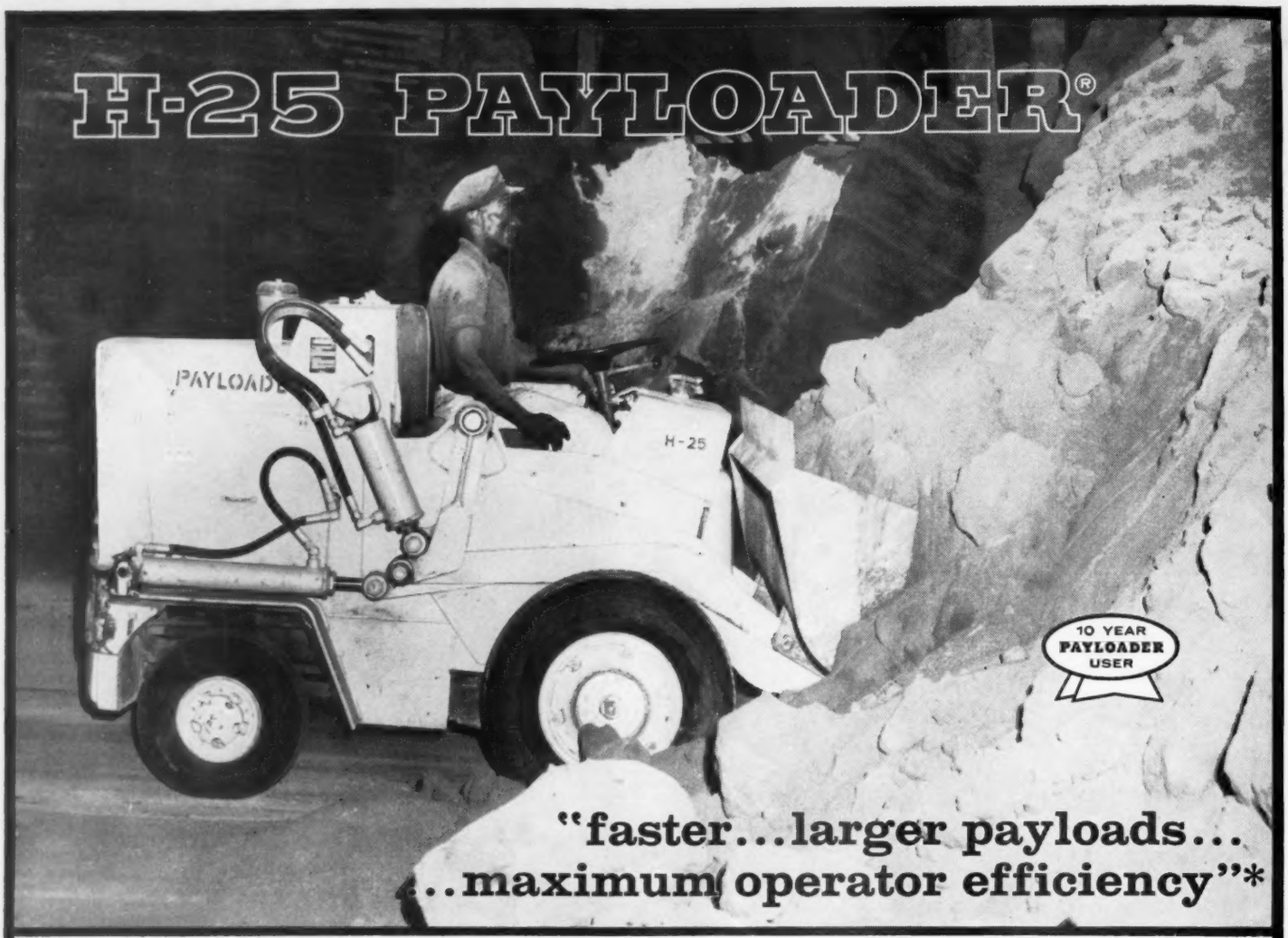
H-25 PAYLOADER®



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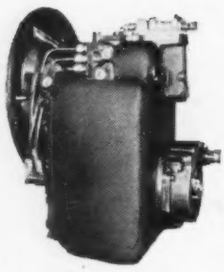

. . . the only tractor-shovel in its size range with full power-shift transmission having two speeds forward and two reverse . . . the low range for digging power and close maneuvering . . . the high range for fast, economical travel in either direction.

*"We have been using 'PAYLOADER' units for some 10 years with very satisfactory service. Our latest, the H-25, is doing an all-around better production job. It is faster, carries larger payloads and we get maximum operator efficiency because of less operator fatigue", says J. E. Dorland, Mgr. McMillan & Harrison Fertilizer Co., Mobile, Ala.

BUILT-IN MANEUVERABILITY AND SPEED

The Model H-25 with 2500 lb. carry capacity, only 6 ft. turning radius, power-shift and easy power-steering is the most concentrated package of tractor-shovel ever designed. "No-spin" differential and 4500 lbs. of bucket breakout force are two other reasons for the outstanding traction and digging power of this superior tractor-shovel.

LOWER MAINTENANCE — LONGER LIFE

The boom and bucket mechanism is rugged and simple with fewer parts and linkages and with anti-friction bearings at critical pivot points. Triple air cleaning for the engine, cartridge-type filters on all three oil systems, self-adjusting sealed hydraulic brakes and special grease and oil seals at all pivots and ball joints all contribute to long life and low maintenance.

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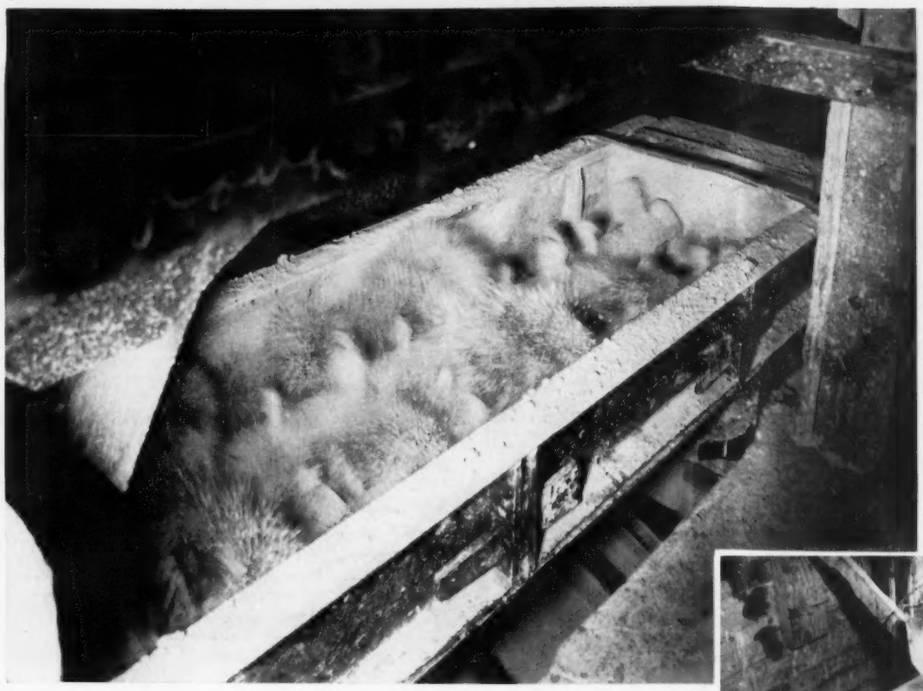
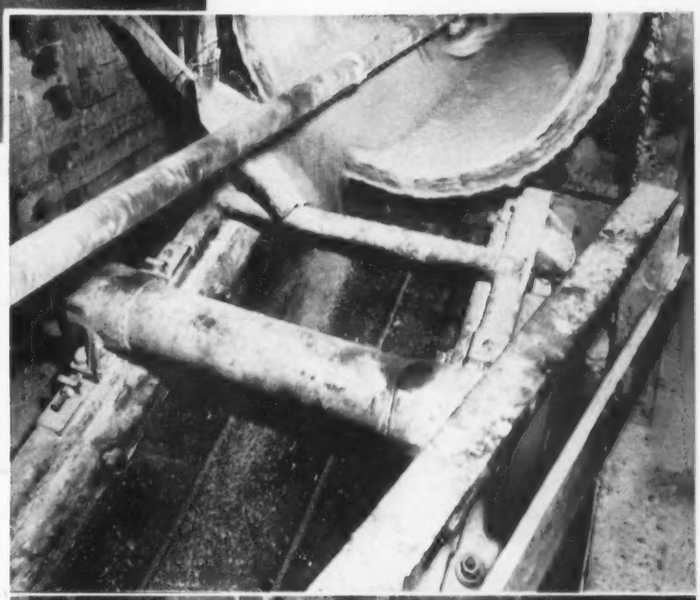
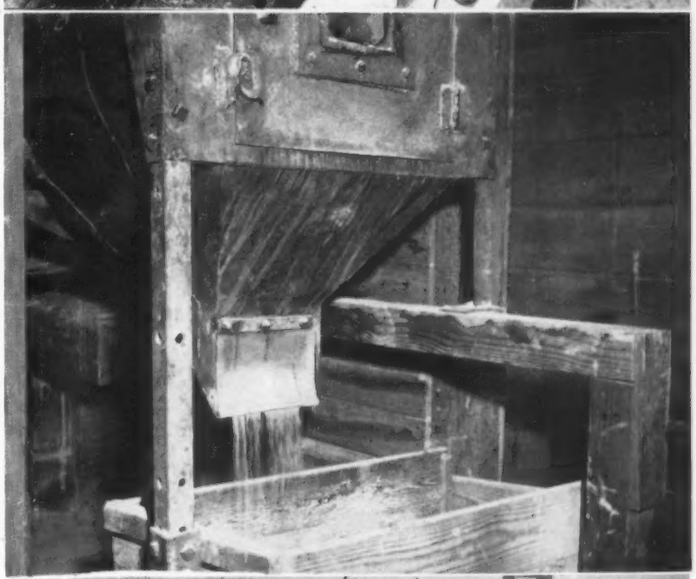






INSIDE PLANT—E. Rauh & Sons Fertilizer Co. utilizes modern methods of fertilizer manufacture in producing high-analysis granular products. At left is fertilizer material going through the conditioning mixer as a slurry. Below is the granulator, a revolving shell equipped with a longitudinal paddle shaft. The material is later cooled below 105° F. to prevent reversion to pentoxide in bulk storage, and sent to storage from chute in second photo. Below are E. W. Frietzsche, superintendent and Robert Liebetrau, general superintendent of Rauh's Indianapolis facility, at plant's control panel.

E. RAUH & SONS . . .

Indiana Plant Uses Modern Processing In Fertilizer Output

PROBABLY FEW fertilizer manufacturing plants can claim as many "firsts" in important areas as does the E. Rauh & Sons Fertilizer Co., Inc., of Indianapolis, Ind. This firm, starting many years ago with its raw material source then consisting largely of waste from the nearby stockyards, now operates a modern and efficient plant producing granular mixtures.

Through the years, the company has always looked with favor on innovations and more efficient ways of manufacturing. It claims the distinction of being one of the very first fertilizer plants in the midwest; it was the first to utilize 80-lb. paper bags for its finished goods; it was the first to use anhydrous ammonia (in 1923) and the first to sponsor programs resulting in corn yields as high as 241 bu. an acre, according to S. J. Martenet, proprietor of the firm.

In describing the process employed in his Indianapolis plant, Mr. Martenet said that it results from a quest to find the highest analysis complete fertilizer that can be made with physical properties permitting storage in bulk or bags for long periods of time without deterioration. Nitrogen sources are ammonia and ammonium nitrate.

Mr. Martenet says that by using triple superphosphate, analyzing 46% or better of available pentoxide, it is possible to make analyses as high as 6-24-24 and 16-16-16. The process brings ammonium nitrate solution, water and ammonia together in the liquid phase of the process.

A solid phase comprising superphosphate, triple superphosphate, potash salts, and such other salts as trace elements, etc., is screened through a 10 mesh vibrating screen. The oversize is crushed and re-screened to effect homogeneity of the product.

The liquid phase is made up of ammonia, 83% ammonium nitrate solution, nitrate fertilizer solutions, and water, or any of them, in the proportions necessary to reach the final analysis desired. This liquid phase must generally be held at 130° F. or above, to prevent supersaturation and crystallization, he says.

The solid phase is fed continuously through an automatic weight feeder into a slurry mixer of double paddle shaft design. The liquid phase is fed continuously into the mixer through a rotometer and ratio control system, coupled to the dry feeder. Mr. Martenet says it is unnecessary to bring the elements of the liquid phase together before going into the slurry mixer. If preferred, they may be proportioned and introduced into the mixer separately.

A slurry is effected by distributing the liquid phase under the surface of the solid phase as it enters the front end of the slurry mixer. This slurry contains from 10% to 16½% total moisture and is thoroughly mixed.

The temperature of the mass becomes 165° to 200° F. during its passage through the mixer. A slurry must be maintained to bring about the desired chemical reactions and to secure homogeneity of the product. The material remains in the slurry mixer from 10 to 15 seconds, at which time it spills over a retaining dam at the end of the slurry mixer into a conditioning mixer of similar design.

Here, the materials receive a crushed, recycle material which has passed through a mixer and granulator, and has been rejected as oversize from a 5 mesh screen immediately ahead of the dryer. The recycle material is 2½ to 5 times the weight of the slurry.

The mass is converted, while traveling the length of the conditioning mixer, to soft granules ranging in size from ½" diameter to very small pellets. The material remains in this conditioning mixer from 10 to 15 seconds with the temperature at 115° to 120° F. before entering the granulator, and the moisture rises from 7 to 15%.

The addition of recycle to the contents of the second conditioning paddle mixer reduces the tendency of

Turn to RAUH page 22

READY FOR WINTER?

With the fall heating season approaching, it is time to thoroughly inspect and overhaul boiler room and heating systems, experienced boiler manufacturers remind the trade.

Russell E. Emrich, Sr., president and general manager of Boiler Engineering & Supply Co., Inc., Reading, Pa., says this is particularly important in commercial and institutional installations where boilers and heating systems are operated largely unattended throughout the winter. Here are some tips on boiler maintenance:

Motors on blowers and circulators should be carefully lubricated, and belt drives checked and rematched after a couple of days operation. The entire fuel oil system should be checked, oil strainers cleaned and burner nozzles inspected and adjusted.

Inspect feedwater makeup pumps and hot water system circulators for leaking packing. Alignments should all be rechecked. On steam systems the condensate tank should be cleaned and flushed and the steam traps should be cleaned and put back into operating condition.

Firetubes should be inspected and cleaned of accumulated soot. Front and rear covers should be opened to permit removal of the accumulated noncombustible products of combustion. Any progressive increase in stack temperature during the operating season indicates needed fireside cleaning.

Waterside should be inspected for evidence of scale, sludge, corrosion, or pitting. A local water treating authority should be consulted for correcting water conditions. The boiler should be filled immediately and warmed up slowly in preparation for winter service.

YOU'RE INVITED . . .

Program Plans Complete for Industry-Wide Safety Conference in Chicago, Oct. 19-20

CHICAGO — Final plans are completed for the annual meeting of the fertilizer safety section, National Safety Council, at the LaSalle Hotel, Chicago, Oct. 19-20. The two-day meeting will include an election of officers for 1960, papers presented by safety experts, a luncheon talk and a series of group discussions.

Opening Monday morning, Oct. 19, the group will hear greetings from George A. Pelton, national chairman of the fertilizer safety section of NSC. Mr. Pelton is with Smith Agricultural Chemical Co., Columbus, Ohio, and has served as chairman of the section since last year's meeting.

William M. Cox, professor of industrial safety at Georgia Tech, Atlanta, will speak on the subject of "Look Below the Surface" during the morning program, and Albert E. Walker, regional supervisor of Travelers Insurance Co. will discuss the question, "Have We Forgotten Fundamentals?"

Emerson M. Jones, Midwest technical service supervisor of the Nitrogen Division of Allied Chemical Corp., will wind up the morning's program in a discussion on "Avoiding Potential Hazards in Use of Nitrogen Solutions."

A luncheon on Oct. 19 will feature Tom Clarke, GLF Soil-Building Service, Ithaca, N.Y., as speaker. Mr. Clarke is a past national chairman of the fertilizer section and long prominent in its activities.

Tuesday, Oct. 20, the group will be divided into segments for the purpose of discussion, with John E. Smith, Spencer Chemical Co., Pittsburg, Kansas, as leader. Mr. Smith is also a past chairman of the national group and a leader in industry-wide safety activities.

Officers in the national group, in addition to Mr. Pelton, chairman, are: Elmer C. Perrine, Nitrogen Division, Allied Chemical Corp., vice chairman, and A. I. Raney, Phillips Chemical Co., Bartlesville, Okla., secretary.

The safety meeting in Chicago will also hear discussions on the scheduled five safety schools held in various portions of the country. Three of the schools have been completed. These were held at Ithaca, N.Y., for the Northeast; Chicago, for the Midwest, and Atlanta, Ga., for the Southeast.

Still to be held is the Far West school scheduled for Fresno, Cal., Nov. 5-6 under the direction of O. J. Chinnock, technical representative of Hercules Powder Co., and a school for the Southwest, which will be held in Houston, Texas, Nov. 12-13, under the direction of A. I. Raney. The schools are open to all supervisors in the fertilizer industry.

As over-all director of the supervisory training program, W. C. Creel, safety director, Department of Labor of the State of North Carolina, has guided the organization of the schools to see that effective instruction was planned and administered.

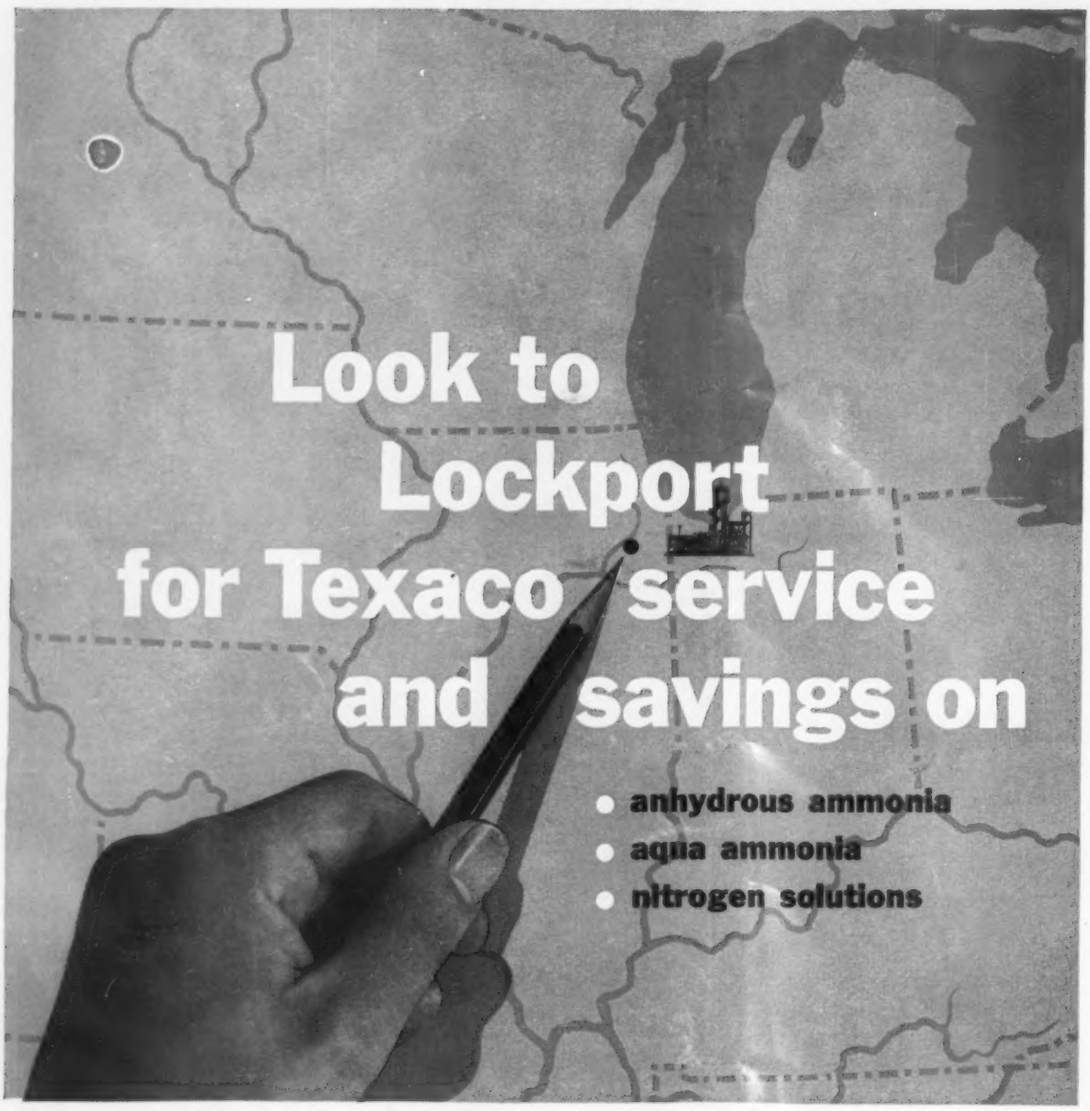
All representatives of the fertilizer industry interested in reducing hazards are encouraged to attend the fertilizer section meeting in the LaSalle Hotel, Chicago, Oct. 19-20.

Phosphate Potential Described by Speaker

DENVER, COLO.—Dr. O. E. Potier, director of mining operations at Pocatello, Idaho, for J. R. Simplot Co., told the American Mining Congress Sept. 16 that the intermountain phosphate belt is producing at the rate of two and one-half million tons of "rock" annually.

He also said that the phosphate deposits in Utah, Idaho, Wyoming and Montana contain 60% of the nation's reserves of phosphoric.

"These deposits have been known for 60 years, but only in the last 15 years, has any widespread interest been shown in them," he stated.



Why you get fast service: Texaco is situated right in the heart of the farm belt. Short shipping distances result in faster service for formulators, lower transportation costs. Your orders are handled promptly and efficiently, and deliveries are scheduled to tie in with your operations.

How you save on aqua ammonia: Texaco's exclusive 50% aqua ammonia concentration results in important dollars and cents savings on transportation. You need order only two tank cars (or trucks) of this solution for every three cars of regular 29.4% solution you bought in the past. Dilution of the 50% concentration in your plant is simple.

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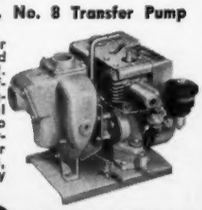
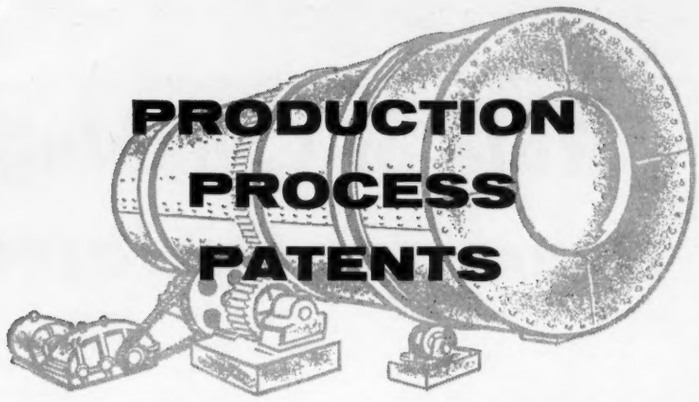
what's NEW?

Broyhill No. 8 Transfer Pump

A complete unit for transferring liquid fertilizers 100 gal. per minute. Self-cleaning, non-clogging. Centrifugal pump coupled to engine on carry-stand. Write for complete details, prices and delivery date, to:



the Broyhill COMPANY DAKOTA CITY, NEBRASKA

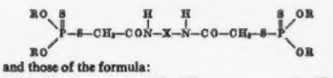


2,901,317

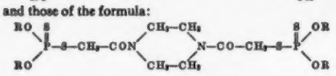
Anti-Caking Agent for Ammonium Nitrate. Patent issued Aug. 25, 1959, to Paul O. Marti, Jr., Munster, Ind., assignor to Standard Oil Co., Chicago. A particulate composition consisting of ammonium nitrate particles coated with a comminuted copper oxide, which coated particles are characterized by substantially free-flowability at atmospheric humidity and by a storage stability substantially that of dynamite grade ammonium nitrate.

2,901,481

Processing for Preparing Dialkyldithiophosphoric Acid Ester Derivatives Having Two Amide Groups in the Molecule and the Insecticidal Compounds Obtained Thereby. Patent issued Aug. 25, 1959, to Raffaello Fusco, Giuseppe Losco and Mario Perini, Milan, Italy, assignors to Montecatini-Societa Generale per l'Industria Mineraria e Chimica, a corporation of Italy. An insecticide taken from the group consisting of those of the formula



and those of the formula:



in which respective formulae R is a number of the group consisting of methyl and ethyl, and X is a bridging group taken from the class consisting of $—CH_2—$, $—CH_2—CH_2—$, the phenylene radical $—C_6H_4—$, the mixed aliphatic-aromatic chain

$$—CH_2—C_6—H_4—CH_2$$

2,901,403

Underground Storage of Ammonia and Its Recovery. Patent issued Aug. 25, 1959 to Loyd W. Adams and John E. Cottle, Bartlesville, Okla., assignors to Phillips Petroleum Co., Bartlesville. A method for storing liquid ammonia and recovering same from the storage comprising introducing liquid ammonia into an underground storage space in a subterranean salt formation, introducing a synthetic ammonia plant off gas into said storage space under pressure, withdrawing a liquid comprising liquid ammonia from said storage space by displacement with said gas, introducing the withdrawn liquid comprising liquid ammonia into a fractionating still, introducing water into said still, adding reboiling heat to the kettle section of said still, removing vapors from the top of said still, condensing said vapors, dividing the condensate into two portions, returning one portion to the upper portion of said still as reflux, removing the other portion as the main product of the process and removing a salt brine from the kettle of said still.

2,901,340

Method of Producing Concentrated Mixtures of Nitric and Phosphoric Acid. Patent issued Aug. 25, 1959, to Georg Von Semel, Berlin-Grunewald, and Heinz Lehmann, Berlin-Neukolln, Germany, assignors to Pintsch Bamag A.-G., Berlin, Germany. In a method of producing concentrated mixtures of nitric acid and phosphoric acid, the step of passing a nitrogen oxide gas and a gas containing free oxygen into a dilute phosphoric acid solution having an inorganic salt selected from the group consisting of potassium sulfate, sodium nitrate, calcium nitrate, potassium nitrate, magnesium nitrate and magnesium sulfate dissolved therein in an amount between 1% by weight and the solubility limit of said salt, whereby said nitrogen oxide gas is absorbed and converted to nitric acid, the absorption of said nitrogen oxide gas being promoted by said inorganic salt, thereby forming a concentrated mixture of nitric and phosphoric acids.

2,903,349

Fertilizer Composition Containing Calcium Silicate. Patent issued Sept. 8, 1959, to Louis D. Bryant, Indianapolis, Ind., assignor to Columbia-Southern Chemical Corp. A fertilizer composition protected against caking in the presence of moisture comprising in admixture a source of plant nutrients in substantially dry powdered form having a normal tendency to cake in the presence of moisture and, in the amount of from about 1 to 10 percent of the total, finely-divided, hydrated, precipitated calcium silicate having about 3.0 to about 3.4 moles of SiO_2 per mole of CaO and an average ultimate particle size in the range of about 0.01 to 1 micron, said calcium silicate being the product precipitated in a vigorously agitated solution from a soluble calcium salt and alkali metal silicate having about 3.0 to about 3.4 moles of SiO_2 per mole of alkali metal, separated therefrom, dried and pulverized, the character and concentration of said calcium silicate protecting the composition against caking.

2,902,250

Process for the Refining or Beneficiation of the Isomers of Benzene Hexachloride. Patent issued Sept. 1, 1959 to Robert Charles Chuffart, Widnes, England, assignor to Imperial Chemical Industries, Ltd., London. A process of separating gamma isomer from a mixture of benzene hexachloride isomers containing at least the alpha and gamma isomers which comprises the steps of bringing a continuous flow of a solution of a mixture of benzene hexachloride isomers to a state of metastable supersatura-

Turn to **PATENTS** page 27

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C

OFTEN OVERLOOKED . . .

Role of Crushing, Oversizes Declared

By Harold R. Krueger
Stedman Foundry & Machine Co., Inc.
Aurora, Ind.

THE CRUSHING and grinding of oversize material in the various stages of production and shipment of fertilizer is a problem that seldom receives the attention it warrants. The advent of granular fertilizers, high analysis grades, ammoniation-acidulation formulae, close screen sizing and new types of process equipment has considerably complicated the reduction of oversize material. Selection of equipment should be based on the reduction required, the consistency, characteristics and size of the oversize feed and the average tons per hour fed to the machine.

Before going into the grinding operation, it would be advisable to stop and consider the matter of screening. Recently, one of our good friends in the fertilizer industry brought to our testing laboratory several bags of oversize from his shipping unit screen. His company manufactures a very acceptable pellet-conditioned fertilizer and their problem was—too many fines being produced at the shipping mill and degradation of good material between storage pile and bagged goods.

Before setting up grinding tests, we drew a representative sample from the tailings and ran it through testing screens. We found 58% of minus 4 mesh material already present, clearly indicating a screening malfunction. A correction in their screening operations went a long way towards solving their oversize grinding problem.

We must admit to being amazed by the apparent lack of information that exists in many fertilizer plants regarding the screen analysis of the oversize from either double-deck sizing screens or single deck shipping screens. It would be interesting to know how many tons of good, on-sized, product are being ground to unwanted "fines" every day due to screening deficiencies.

A vibrating screen that has a recommended inclination of 35° for shipping 4 mesh pulverized fertilizers would be entirely too steep for shipping 5 mesh granular. A high percentage of on-sized material would pass rapidly down the screen and into the tailings mill, not having an opportunity to pass through the meshes.

The following suggestions regarding screening might be helpful:

1. Frequent screen analysis of top deck discharge product.

2. Frequent inspection of screen wire for blinding, holes, bulging or sagging of wire cloth.

3. Angle material hits screen. (In most instances should be 90° to screen deck.)

4. Avoid feed chutes that spout material in same direction as slope of screen. Material, through momentum, will pass over screen too rapidly.

5. Avoid side-angle feed chutes that throw material to one side of screen deck. In other words, the whole screen area should be working.

6. Avoid surge loads.

7. Frequent removal of trash, paper, wood, nails and other foreign matter.

8. Check vibration period and stroke with manufacturers' recommendations.

9. Are you using the same screen for granular you used for pulverized?

The inter-relationship of screening and crushing makes it mandatory that the screening operation must do its share of the work before, and after, the crusher, for maximum efficiency of both.

The crushing or grinding of oversize fertilizer materials must be considered on the basis of three factors: where, in the process, is the crushing done—what materials are to be ground—what is the fineness desired? In the average plant, the grinding is done at two or more of the following situations:

1. Raw Materials—Before Weighing.

2. Raw Materials—After Weighing but before mixing.

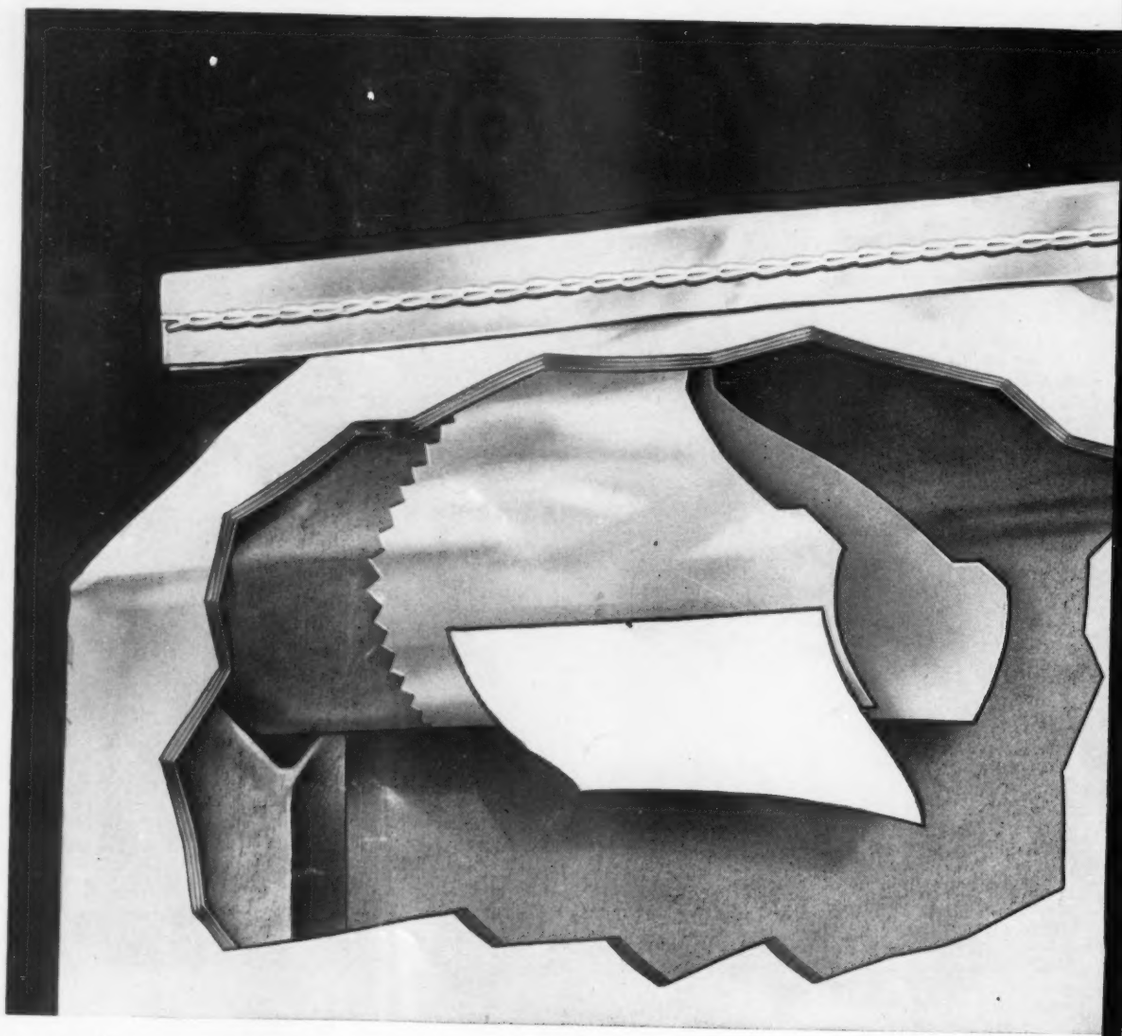
3. Granular Production — On Product Between Dryer and Cooler.

4. Granular Production — On Product After Cooler.

5. Shipping Mill Oversize.

Situations 1 and 2 are fairly compatible, however a selection of a crusher cannot be determined until the size of the ground material is known. A conventional pulverizer or "meal-type" fertilizer plant normally uses a 3 to 4 mesh screen on raw materials. The technical representatives of the solution manufacturers tell us that the finer the superphosphate is ground, the better are its ammoniation rates.

Some granular plant operators want all of their raw materials ground to common size, if possible, even down to 10 mesh material. Other granular "experts" want the raw materials sized as closely as possible to the size of their granular product, say—6 plus 16 mesh. It is difficult to voice an opinion on the optimum size of grind for fertilizer raw



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Grinding Weighty

materials. Individual plant process, formulation and equipment (plus pet theories) would have to be considered.

At this point it must be said that the producers of raw materials have done a lot of good work in providing the fertilizer industry with decidedly improved basic ingredients. Potash salts, sulphate of ammonia and triple superphosphate are offered in various sizes and textures, alleviating a lot of conditioning problems for the mixing plant. Organic materials seldom present a problem, as their condition is usually in a ground state when received.

Unfortunately, little of the above applies to single or run-of-pile superphosphate. There is a lot of bad run-of-pile still being used. Over-acidulated, under-acidulated, fine and floury, hard and lumpy, full of hard pebble dribbles from conveyor idlers, this material can cause more grinding headaches in ten minutes than all the other raw materials will in a year. Since this material averages about 50% of all raw materials used, any grinding unit must be designed to handle the reduction of considerable quantities of run-of-pile superphosphate oversize.

Situation 3 is the most difficult. While we agree that it is much easier to cool a small particle than a large one, it is also much harder to grind a large, hot particle that is probably quite sticky in the center. It is good to be able to return hot re-cycle to the ammoniator in place of cool material. It is also quite a problem to screen hot material, especially in the smaller screen sizes. If grinding must be done between dryer and cooler, it is imperative to choose equipment that has the lowest build-up propensities and the highest in accessibility.

Situation 4, where grinding is done after product has passed through cooler and over sizing screens, must be considered in view of the end use of ground product. If material from crusher is going into finished goods storage, minimum grinding or just "cracking" is required. If fines are wanted for recycle purposes, then more grinding is required, which will necessitate a more active type of mill.

Situation 5, shipping mill screen oversize, normally requires the least pulverization and has the easiest product to grind. Just enough cracking to get the product through the screens is all that should be desired.

Grinder Equipment Types

1. Hammer Mill: Consists of a rotor having 4 to 6 rows of free-swinging hammers, adjustable grinding plate and cage bars. Will produce the finest product with minimum amount of unground oversize to recycle. Highly susceptible to interior build-up when handling large quantities of fresh or partly-cured superphosphates.

2. Swing or Fixed Arm Pulverizer: Consists of one row of (usually four) swinging or fixed arms revolving through side grinding plates. Fairly trouble free in operation but, since no close clearances are present between rotating and fixed grinding surfaces, requires considerable recycle of material before final reduction is accomplished.

3. Cage Mill: Consists of two or more rows of horizontal pins on counter-rotating shafts. Material enters into center, working its way out through pins, grinding done largely by impact. Since there are no close tolerances present, operates fairly free from plugging. Housing requires regular clean out, due to material impingement. Can handle fairly large quantities of recycle.

4. Chain Mill: Several types available. Consists of rotor having various kinds of chain freely swinging. Reduction is all by impact. Will not produce a fine product. Best suited to "crack" oversize where minimum of fines are required.

5. Roll Crushers (Single or Multiple): Accomplish reduction by crushing material between one or more rotating flat or corrugated surfaces. Since most fertilizers and fertilizer materials are very prone to adhere on crushing, roll crushers usually present considerable maintenance and clean-out problems.

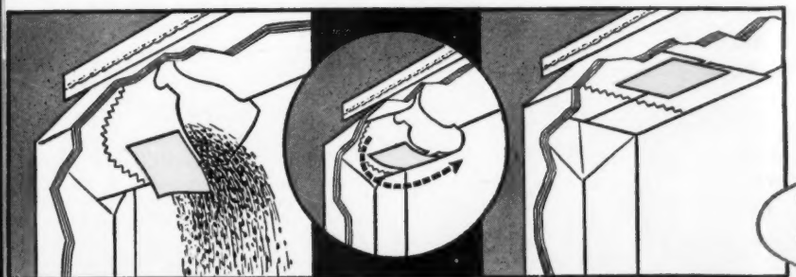
Most articles of this type conclude with either a summation, opinion or recommendation. If we were to so conclude, we would surely be accused of one or more of the following: (a) biased in favor of our line, (b) ignorant, (c) unfair to competition; therefore we will just make the suggestion that, before purchasing fertilizer grinding equipment, the following data be assembled:

Check List for Crusher or Grinder Installation

1. Where to be located, process-wise?
2. What materials are to be ground?
3. What capacity required, in tons per hour?
4. What is maximum lump size in raw feed?
5. What is average size of material to be ground?
6. What is worst moisture content?
7. What is maximum temperature of feed?
8. What size product required?
9. Are fines objectionable? If so, what fineness?
10. Is grinder in closed circuit with screens?
11. How is grinder fed (chute from screens, conveyor, etc.)?
12. End use of ground product? (Recycle, to product, other?)

We believe that the answers to the above list will not only more fully acquaint the operator with his own problems, but will also enable an experienced crusher manufacturer to furnish a definite recommendation as to type, size and cost of equipment required.

multiwall sleeve valve



WON'T CLOG . . . This view shows how the Magic Yellow check flap falls freely aside from the valve slit, giving no interference whatever to proper operation of the packing spout. The sleeve won't choke or clog the packer.

POSITIVE CLOSING ACTION . . . This diagrammatic picture shows action as the flap starts to close over the valve slit.

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U.S. Sulfur Production Slips in June, '59, But Imported Materials Increase Tonnages

WASHINGTON — The U.S. sulfur industry produced 346,887 long tons of native sulfur and 58,679 tons of recovered sulfur of 97% purity or greater, in June, 1959, according to reports of producers to the Bureau of Mines, U.S. Department of Interior.

The 346,887 tons of native sulfur for June was less than that produced the month before (389,212 tons) and also lower than the 383,664 tons tallied in June, 1958, according to the report.

January-to-June production figures show a drop from the similar period of 1958, the Department reports. The first six months of 1958 saw 2,507,306 tons produced, as compared to 2,164,626 tons during the first half of 1959.

Imports of sulfur from Canada and Mexico were up in June, 1959. During this month, a total of 92,568 long tons, valued at $1,941,937 was shipped into the U.S., compared to 28,222 tons worth $612,294 in June, 1958.

Imports during April and May, 1959, were also on the increase, according to the report. April saw 57,081 long tons worth $1,224,449 come into the country, and in May the figures were 63,476 tons worth $1,401,032.

The sulfur report was prepared by L. P. Larson and James M. Foley, under the supervision of G. W. Josephson, chief, branch of construction and chemical materials, division of minerals, Department of the Interior.

Raymond Bag Co. Appoints

MIDDLETOWN, OHIO—R. G. Roberts, Jr. has been appointed to the newly created position of assistant sales manager of the Raymond Bag Corp., D. F. Wicks, general sales manager, announced.

Mr. Roberts formerly was associated with the firm's Chicago sales office.

Boiler Firm Names New Sales Manager

READING, PA.—Joseph A. Hohenleitner has been made sales manager of the Continental Boiler division of Boiler Engineering & Supply Co., Inc., Phoenixville, Pa., according to W. B. Riley, vice president and director of sales. The firm makes boilers in 18 sizes and in two different models from 20 h.p. to 600 h.p. size.

Mr. Hohenleitner joined the company in 1951. He was previously assistant sales manager for the company and prior to that handled application engineering and purchasing department responsibilities.

Bemis Bro. Bag to Construct New Plant

ST. LOUIS, MO.—Bemis Bro. Bag Co. has announced plans for the construction of a new, modern, one-story manufacturing plant in the San Francisco Bay area. The new plant, expected to be completed in late spring of 1960, will be built in Newark, Cal., and will replace the company's present San Francisco plant.

The modern structure will occupy 155,000 square feet of a 17-acre tract and will be one of the key production units for the company on the West Coast, according to F. G. Bemis, the firm's president.

Mr. Bemis described the new facility as another step in the company's program to increase production efficiency and level of output.

The new plant, which will manufacture multiwall, burlap, cotton, open-mesh and waterproof laminated-textile bags, will be the seventh new Bemis plant built in the past six years.

The company's first factory in San Francisco was built in 1897 but was destroyed in the great earthquake and fire of 1906. The next year, Bemis built the present structure, which will be vacated. Sales offices, presently located at the plant, will be relocated in downtown San Francisco.

British Ammonium Nitrate Plant in Full Production

STANFORD - LE - HOPE, ENGLAND — A new ammonium nitrate plant of 14,000 tons a year capacity, is now in full operation here. Built by Fisons, Ltd., the plant occupies some 25 acres of its 63-acre site, and its output represents about 15% of British supplies of fertilizer grade nitrogen, according to the London Times Review of Industry.

The plant utilizes ammonia made at the adjacent Shell Chemical Co. plant at Shellhaven. Ammonia is stored at Stanford-le-Hope in a 2,000-ton Hortonsphere, said to be the largest in Britain.

A description of the plant's operation, as carried in the paper, said that catalytic oxidation of ammonia is achieved over a platinum-rhodium catalyst at high pressure. It has a capacity of 223 tons of 100% acid a day.

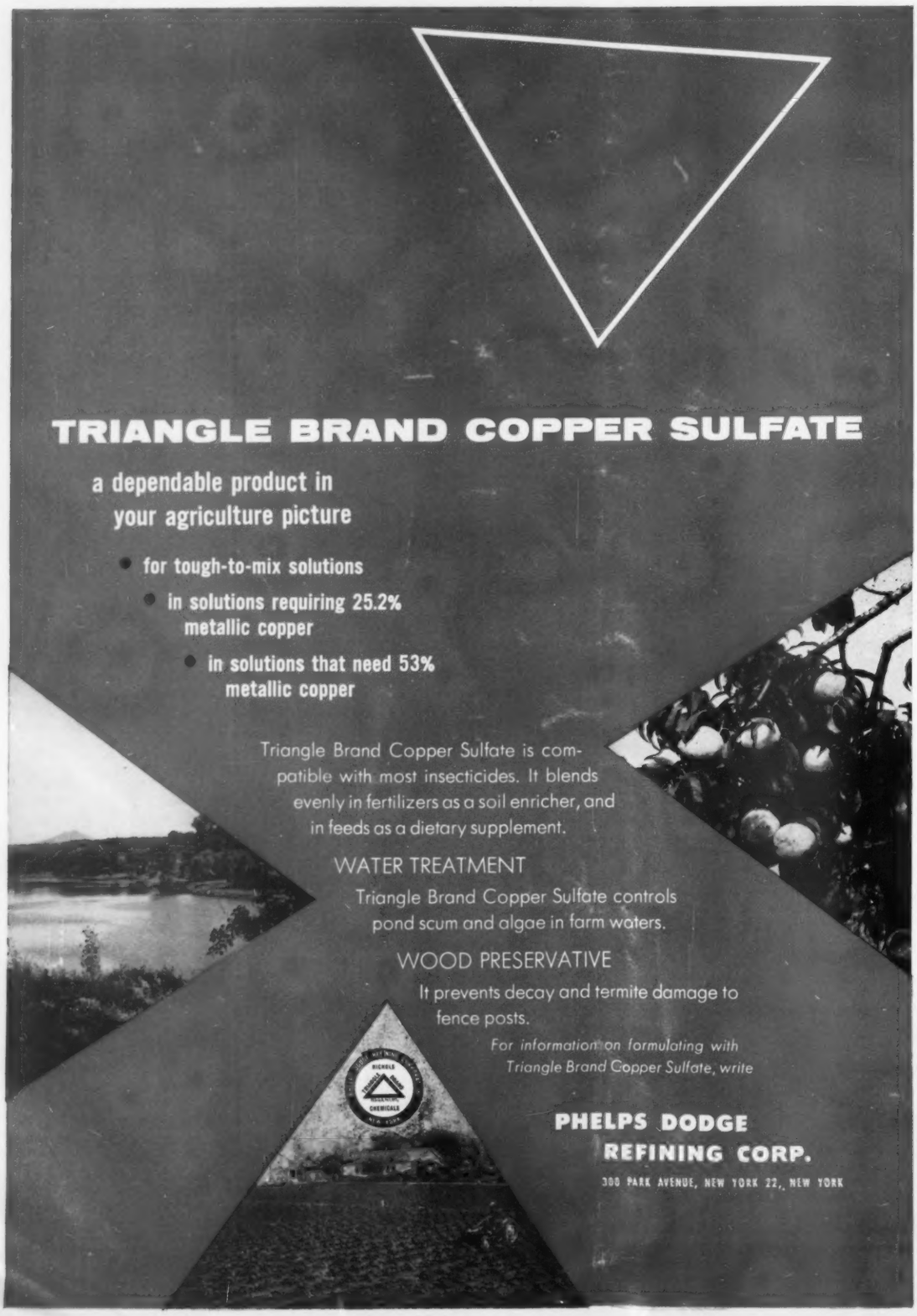
Kraft Bag Appoints New Assistant Sales Manager

NEW YORK — H. D. Wellington has been appointed to the newly-created post of assistant general sales manager of Gilman Paper Co. and its subsidiaries, St. Marys Kraft Corp. and Kraft Bag Corp. The announcement, made by H. C. Lawless, vice president and director of sales for the firm, said that Mr. Wellington's headquarters would be at 630 Fifth Ave., New York. Mr. Wellington was formerly western sales manager with headquarters in Chicago.

Another personnel shift announced by Mr. Lawless was that of J. S. Ritter, formerly assistant, who now becomes western sales manager. J. J. McDermot will be his assistant.

USDA YEARBOOK PUBLISHED

WASHINGTON—The annual yearbook of the U.S. Department of Agriculture will be devoted to "Food," USDA announced. Sept. 27 is the book's publication date. Authored by some 72 nutrition experts, the 736-page volume consolidates a large portion of current knowledge on the subject. Copies are available at $2.25 each from the Superintendent of Documents, Washington 25, D.C.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Arcadian® News

Volume 4 | For Manufacturers of Mixed Fertilizers | Number 9

Record Crops This Year Indicate Good Fertilizer Market for 1960

Record cotton and corn crops plus continued high farm productivity in general are promising indications of another good fertilizer year in 1960.

Latest official crop forecasts from Washington predict the highest cotton crop in history, more than 14,800,000 bales. That's a resounding 29% increase over last year's crop. More significant, with yield prospects good to excellent in all states, the indicated per acre cotton yield is 474 pounds. That tops the past 10-year average by 145 pounds. Production records like this set plant food removal records too.

Based on known plant food requirements, this year's anticipated cotton production represents a calculated soil fertility drain of 296,300 tons of Nitrogen, 148,150 tons of P_2O_5 and 98,742 tons of K_2O. *(This is the plant food removed by lint and seed, not including that required by stalks, leaves and burrs.)*

To maintain their high rate of production, farmers will need large supplies of mixed fertilizer next year.

Cotton this year is being grown under a new Federal program designed to open up broader markets by lowering price supports to growers. The program permitted growers to expand acreage, and they did, increasing cotton land from 11,849,000 acres harvested last year to nearly 15,000,000 acres this year. Most of this acreage had been in the Soil Bank during 1958.

Observers in Washington believe there will be no major farm legislation to change the government's cotton program between now and the next crop season. With expanded acreage and farmers aiming at increased yields too, the cotton belt fertilizer market looks promising.

Recent forecasts from the corn country indicate a tall crop of 4,173,470,000 bushels this year that stands 10% above last year's record production. Although yield per acre is slightly lower, removal of acreage allotments in commercial areas resulted in a 14% increase in corn acreage this season.

ESTIMATED PLANT FOOD REMOVAL BY MAJOR CROPS IN 1959
(Based on latest forecast production figures, August 1, 1959)

	Tons of N	Tons of P_2O_5	Tons of K_2O
CORN (4,173,470,000 bu.)	1,878,061	730,190	521,502
COTTON (14,815,000 bales)	296,300	148,150	98,742
WHEAT (1,118,960,000 bu.)	699,350	349,670	209,800

Plant food removal is calculated: on CORN for grain alone not including stover; on COTTON for lint and seed, not including stalks, leaves and burrs; on WHEAT for grain, not including straw.

Huge Need for Fertilizer

This tremendous corn crop will take a fantastic amount of plant nutrients from the soil. Figuring from known plant food requirements for grain alone (excluding stover), removal of this much grain adds up to a calculated soil fertility drain of 1,878,061 tons of Nitrogen, 730,190 tons of P_2O_5 and 521,502 tons of K_2O.

Replacing that plant food for continued high production of corn offers a challenging fertilizer sales goal.

Although wheat and other grains showed lower prospects for yields and production this year, these crops still present a continued need for quality mixed fertilizers.

Looking at estimated total crop production, officials report the prospects are edging within 3% of last year's outstanding record. Among the leaders besides cotton and corn, sugar beets, dry peas, soybeans, dry beans and rice are running higher or equal to previous record production.

U.S.D.A. agricultural scientists at Beltsville, Maryland, recently reviewed the subject of plant food removal from

(Continued on following page)

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the soil. Looking at 1958 harvests, the scientists gave this priority to plant nutrient replacement in the soil: nitrogen, first; potash, second; and phosphorus, third.

As modern farmers strive for continually higher yields per acre, fertilizer is their best bargain. Surveys of rising farm production costs have indicated that fertilizer remains one of the best investments farmers can make. Fertilizer puts growing power into each acre and farmers know it.

Farm income in general is good this year, although it has dropped somewhat from last year's high level. However, buying power for the tools of high production is strong. After this season's heavy plant food removal, fertilizer will be needed to maintain production and farm income.

Farm advisors, county agents and other agricultural specialists have been advocating increased use of fertilizer to boost yields and cut costs of production. That fact of economics, combined with the plant food reduction in this big crop season, can lead to bigger sales for fertilizer in 1960.

SELL MORE FERTILIZER THIS FALL!

1958-59 was a big tonnage year for fertilizers. The best way to make 59-60 surpass it in sales is to sell more fertilizer this fall, ahead of the spring rush. Many farmers are good prospects for fall buying—if we get out and sell them. And, more than anything else, the fertilizer industry needs to expand its delivery seasons to take the pressure off spring production and shipping. Also, remember that fall discounts on ammoniating solutions and potash offer you better profit possibilities on mixed goods made and sold this fall than on those produced next spring. *Now is the time for action!*

More Farmers Use Fall Fertilizers

Leading farmers in many areas have been using more and more fertilizer in the fall. And they are seeing the advantages of fall application in: use of slack season labor, longer pasture seasons, better crop yields and reduced winter-kill of grain and hay stands.

The soil is a more economical place to store fertilizer over the winter than a barn or a dealer's warehouse. Fall-applied fertilizers have given excellent results on sod crops throughout the U.S. Fall plowdown of fertilizers has proved practical except on light sandy soils or in areas where winters are mild and humid.

Our long-accepted fall markets for fertilizer are expanding along with newly-accepted practices. Many stands of alfalfa and other legumes were winter-killed in the North last year. Farmers are anxious to do better this winter. Fall application of mixed fertilizer helps maintain thick, long-lived legume stands. Meadows, where legumes have run out, need high-nitrogen mixed fertilizers.

Fruit crops, too, can be fertilized in the late fall. Fall vegetables are another good market, and many growers like to apply fertilizer to cover crops in the autumn.

The burning of small-grain straw and stubble has almost disappeared, as farmers have found that plow-down of fertilizer with this organic matter improves the soil and helps build bigger yields of succeeding crops. When you work to build this plow-down market, you can also emphasize the value of fertilizer in the grain drill at planting time. This helps even late-planted fields to come up to a good stand that will live through the winter to produce a good crop.

Many farmers, as well as experiment stations, in the North have proved that grass haylands and pastures need fertilizer before fall freeze-up to strengthen the roots for earlier, heavier spring growth. Oats, wheat, clover and other grazing crops in the South need heavy fall fertilization to produce extra forage as well as a profitable grain crop. Thousands of acres of Coastal and Midland Bermuda grass that produce large tonages of feed in the warm months use huge amounts of plant food. Winter grazing crops, inter-seeded in such sod, are especially in need of heavy fertilizer application.

Fall Plow-Down

Cotton planters like to chop their stalks after harvest in early fall, to reduce insect carryover, and in heavy soil areas they may also plow out the old beds. Fall application of mixed fertilizer is an efficient way to get ready for the next crop, to help improve insect control, and to build extra growth of winter cover crops.

Corn land is one of the biggest fall fertilizer markets. Plow-down of fertilizer

with corn stalks and stubble is a soil and yield builder. This practice also works well for other heavy-feeding crops, such as sorghum and sugar beets.

Soil compaction by heavy equipment is one problem farmers avoid by fall spreading of fertilizer before plowing. Fall, with its dry ground, is the ideal time to spread fertilizer by truck or heavy tractor, without excessive soil compaction on sod or on land to be plowed.

Be sure your salesmen and dealers are acquainted with the fall fertilizer opportunities in their respective areas. Information on crop yields and photographs showing results of fall-applied fertilizers in previous years can be very helpful to your salesmen in developing more fall business this year. If varying soil textures are a problem, you will want to equip your men with soil maps indicating specific areas which are suitable for fall fertilizer application.

Fall Use Means Liberal Use

Fall fertilization favors liberal fertilizer application. Modern farming calls for a lot more plant food than a few hundred pounds per acre in the drill or planter. Top-dressing or plow-down in the fall makes heavy fertilizer use easy. It pays producers to do all they can to favor these two important trends.

Take a look at the map of your sales area. Before you finish counting all the acres of corn, small grains, meadows, pastures, vegetables and fruit that could benefit from fall fertilization, you'll probably stop figuring and get right out and start selling!

2-1-1 vs 1-1-1 for Grass

Only a few years ago, typical pasture fertilizers contained little or no nitrogen, and these fertilizers were often supplemented with nitrogen top-dressing. Then 1-1-1 ratios, such as 12-12-12 and 10-10-10, became popular and produced outstanding results. Today, there is a trend to higher nitrogen mixed fertilizers for pastures. Farmers and fertilizer men are finding that they make more money from 2-1-1 ratios, such as 16-8-8 fertilizer for grass.

A 2-1-1 ratio of nitrogen, phosphoric acid and potash does a far better job of meeting the exact plant food needs of grass than a 1-1-1 ratio. On fields that have been neglected, it may be advisable to use a 1-1-1 ratio for a year or two to build up soil supplies of plant foods. But this should be followed with regular use of a 2-1-1 ratio to supply fertilizer nutrients in the approximate ratio in which they are removed by grass for grazing and hay.

In Wisconsin, for example, where many pasture demonstrations have been fertilized with 16-8-8, the net profit per acre from increased forage yields has been exceptional. As a result, wherever fertilizer dealers sell 16-8-8, sales have been much larger than expected.

Complete pasture fertilizer, well-balanced with plenty of nitrogen (such as 16-8-8), produces better returns than a heavy application of 0-1-1 fertilizer followed later by nitrogen top-dressing. Experiments show that a heavy application of straight potash causes pasture plants to take up more of this element than is necessary for high yields. When nitrogen is applied with phosphorus and potash in a mixed fertilizer, the crop uses all of these nutrients more efficiently.

The fall is a good time to apply 16-8-8, and fall fertilization is one of the best ways to insure a much longer grazing season. In the cool weather of late fall and early spring, soil bacteria that provide available nitrogen from the soil become dormant at a much higher temperature than that at which grass becomes dormant. Grass needs plenty of nitrogen in the fall and early spring. For extra profits for you and the farmer, sell 16-8-8 fertilizer for pastures *now!*

AVERAGE RESULTS WITH 11 DEMONSTRATION PASTURE PLOTS, 1958

Fertilizer per acre	Yield per acre dry weight	Increase in yield	Value of increase	Cost of Fertilizer	Extra profit per acre
500 lbs. 16-8-8	8,388 lbs.	4,728 lbs.	$118.20	$21.50	$96.70
No fertilizer	3,660 lbs.				

(From Prof. C. J. Chapman, University of Wisconsin)

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

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Fertilizer Round Table Discussions Center Around Practical Problems in Processing

WASHINGTON—A three-day program devoted to solving problems involved in fertilizer manufacturing is in store for attendants at the fertilizer industry round table Nov. 4 6. Headquarters of the meeting, expected to attract some 500 persons, will be at the Mayflower Hotel, Washington.

Under the chairmanship of Dr. Vincent Sauchelli, chemical technologist of the National Plant Food Institute, the program will feature sections covering plant processes from raw materials to bagging; problems of conventional fertilizer manufacture; semi-granular mixtures; statistical quality control; and pre-neutralization.

Other subjects include the mechanics of calculating formulations, and a talk describing the merits of plant models as compared to blueprints.

Question-and-answer sessions will be included in the meeting agenda at different times, according to Dr. Sauchelli. Discussions of topics pertaining to fertilizer manufacturing and processing will be heard not only from formal speakers, but from fertilizer manufacturers in attendance.

On hand to talk on plant processes from raw materials to bagging will be representatives of three manufacturing firms. L. V. Clegg and members of his staff of Canadian Industries, Ltd.; Al Henderson, Wilson & Toomer Fertilizer Co., Jacksonville, Fla.; and Al Jackson, Fertilizer Equipment Sales Corp., Atlanta, will participate.

Three speakers are scheduled to present details of calculating formulations. They are: W. J. Tucker, GLF analytical laboratory, Ithaca, N.Y.; J. E. Reynolds, Davison Chemical Division, W. R. Grace & Co., Baltimore; and H. H. Tucker, Sohio Chemical Co., Painesville, Ohio.

William C. Weber, Dorr-Oliver, Inc., New York, will discuss the merits of plant models, made of plastic, over conventional blueprints.

Problems of making conventional fertilizers will be discussed from a number of angles, including mechanical condition of the material, use of several solutions, segregation difficulties, and equipment necessary to do a first rate job.

Use of urea-nitrate solutions will be discussed by Dr. J. O. Hardesty, USDA, Beltsville, Md.; H. H. Tucker, and G. R. Gilliam, Nitrogen Division, Allied Chemical Corp.

Use of UAL-solutions will be described by J. W. Lewis, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Dr. W. L. Hill, U.S. Department of Agriculture, Beltsville, is scheduled to talk on the problem of segregation from the standpoint of particle size of raw materials.

The part played by rotary and gravity mixers in preventing segregation will be pointed out by representatives of three machinery manufacturers. Harold B. Krueger, Stedman Foundry and Machine Co., Aurora, Ind.; Walter J. Sackett, of the A. J. Sackett & Sons Co., Baltimore, Md.; and R. E. Robinson, Atlanta Utility Works, Atlanta, Ga., will conduct this portion of the round table.

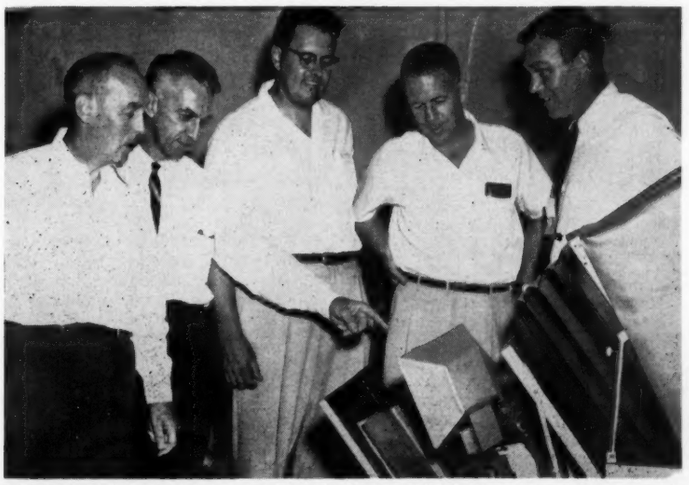
Three aspects of semi-granular mixtures will be discussed. The rotary mixer is the subject pursued by Enos Valliant, Dorchester Fertilizer Co., Laurel, Del.; the Eymann process by George K. Walton, Tennessee Corp., Cincinnati, Ohio; the block sparger, by J. C. Sharp, Spencer Chemical Co., Kansas City, Mo., and L. Dudley George, Richmond Guano Co., Richmond, Va.

Two speakers are scheduled for a discussion of statistical quality control in fertilizer manufacturing. They are Chester H. McCall, Booz-Allen Research, and Vance Ward, Canadian Industries, Ltd.

The final session, on Friday, Nov. 6, will be devoted to a panel discussion on pre-neutralization. Participating in this will be G. R. Gilliam; Grant Marburger, Spencer Chemical Co., Kansas City, Mo.; Philip E. Stone, Virginia-Carolina Chemical Corp., Richmond, Va.; Frank G. Keenen, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; and N. K. Alfrey, Davison Chemical Co., division of W. R. Grace & Co., Baltimore, Md.

Serving on the executive committee of the round table with Dr. Sauchelli, are H. L. Marshall, chief chemist of Olin Mathieson Chemical Corp., Baltimore, Md.; J. E. Reynolds, operations manager, mixed fertilizer division, Davison Chemical Co., division of W. R. Grace & Co., Baltimore, and Albert Spillman, general manager of Fertilizer Manufacturers' Cooperative, Baltimore, Md.

Dr. Sauchelli has announced that registration for the meeting will begin Tuesday evening, Nov. 3.



INSPECTION—During a recent visit to the Toledo bag plant of St. Regis Paper Co., members of the fertilizer division of the Ohio Farm Bureau Cooperative Assn., Inc., Columbus, look over some of the photographic equipment used to reproduce printed material appearing on the multiwall bags in which their products are packed. The plant tour wound up the Bureau's annual meeting of management, sales and production personnel which was held this year in Toledo. Left to right are: Rae Perkins, director of Art & Engraving for St. Regis' multiwall bag division; Lynn Willoughby, manager of the Toledo bag plant; C. N. Griffith and Dennis Lehman of the Ohio Farm Bureau; and Harry Walker, district sales manager for St. Regis.

Company Awarded Patent on Blender

NEW YORK—Patterson-Kelley Co., Inc., has been granted a patent for its Liquid-Solids blender, for "improvements in machines designed to wet or moisten dry powdered materials such as are normally considered to be immiscible because of their tendencies to ball up and 'lump' when coming in contract with small streams or droplets of liquids."

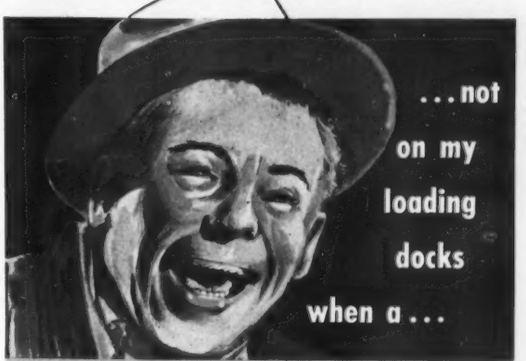
The patented blender consists of two cylinders cut at right angles and joined to form a V-shaped design. This twin-shell mixing principle is said to produce a combined tumbling or rolling action with the simultaneous transverse movement within the entire mass of material, plus a folding action created by the dividing of the mass during rotation. The blender is charged from either of two openings at the ends of the "V" and discharged through an opening at the apex of the blender.

To introduce liquids to solids, a hollow cylindrical bar mounted across the blender axis and equipped with distributing discs, revolves inside the shell to provide controlled liquid dispersion, ranging from a coarse spray for granulations to an extremely fine "fog" or mist for lump-free formulations. Liquids may be gravity-fed or pumped, the makers say.

The liquid feed bar also is equipped with specially-designed agitator blades which, when the bar is rotated at the required speed to centrifugally disperse the liquid, "cavitates" the body of dry materials and maintains it in a locally churned and fluffed-up condition. Approximately 25 different versions of the feed bar assembly have been designed to meet variable blending formulations.

Presently, the blenders range in size from one-quart to huge units of 800 cubic feet or more.

CAR LOAD BAGS BY HAND?



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What's New?

Additional information is available about new products, new services, and literature described in this department. Circle the numbers of items on which you desire more information, fill in your name, your job title, your company's name and address on the card. Then clip it out of the page and mail. No postage is necessary.

No. 9127—Vibrating Conveyor

Syntron Company has announced availability of a new four-page catalog section on mechanical vibrating conveyors, designed for the high speed conveying of most bulk materials. The illustrated catalog presents complete descriptions, data and specifications for seven standard mechanical vibrat-

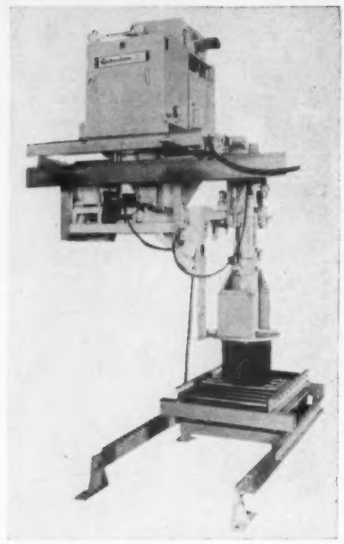
ing conveyors—four "light tonnage" models and three "heavy tonnage" models. The vibrating conveyors find use in practically any industry handling materials in bulk. In addition to conveying, they can be used for preheating, drying, or cooling bulk materials with heated, stepped or water cooled troughs. Free copy of catalog section available by checking No. 9127 on coupon.

No. 9126—Mobile Air Tank

A new, all-purpose mobile air-power outfit for air delivery has been announced by the Campbell-Hausfeld Co. Known as the "Tankmobile Jr.," the unit is said to offer both efficiency and dependability. It features a heavy-duty "Pressure Princess" single-cylinder air compressor on a welded steel, safety pressure tested 7½ gallon tank. It is designed with a low center of gravity and semi-pneumatic 8" rubber tired wheels. Models are available with a ½ h.p. capacitor motor, or a ⅓ h.p. split phase motor. The capacitor motor unit has an automatic pressure switch to control tank pressure 60/80 psi by running the motor only when needed. For further information, check No. 9126 on coupon.

No. 9125—Drum or Bag Filler

A new system that automatically weighs and fills drums or valve bags at a rate up to 600 lb. material a minute has been introduced by Richardson Scale Co. They say the system will handle crystalline chemicals with densities up to 40 lb. a cubic



foot for fine powders and 100 lb. a cubic foot for free-flowing materials. The scale automatically weighs the material and delivers it to a receiving hopper over a "Stoker" packer. The material is deaerated, or compacted, at this point, then conveyed by the packer directly to the filling tube. The system is said to be dust-tight, with all controls located in a dust-tight panel designed for wall mounting. All parts that come into direct contact with the material are of stainless steel and may be washed easily and without danger of corrosion every time there is a material changeover. The scale has a unit capacity of 100 lb. and will discharge as often as six times a minute. Rate of operation of the packer is controlled by an adjustable timer. For full descriptive information on the packer, check No. 9125 on the coupon and mail.

No. 9128—Glass Fabric Filter Bags

Menardi & Company, developers of glass fabric filter bags for high temperature fume and dust filtration, have announced their new No. 600 Maco-Glas filter fabric, which features improvements in permeability rating, efficiency and economy. The new No. 600 fabric shows a permea-

bility rating of 81 cfm per square foot. The makers state that Maco-Glas bags remove dust and other particulate matter from the filtered gases with efficiency equal to previous fabrics, while bag life remains equal. This enables the same operation to be done with a greatly reduced filtering area, or through-put can be increased by two or three times with the same area, Menardi says. The firm also claims that condensation, blinding and corrosion are completely eliminated; that the bags never require shaking, only a periodic collapse through the application of negative pressure. A descriptive four-page folder, "The Modern Solution to Fume and Dust Filtration Problems," is available by checking No. 9128 on coupon.

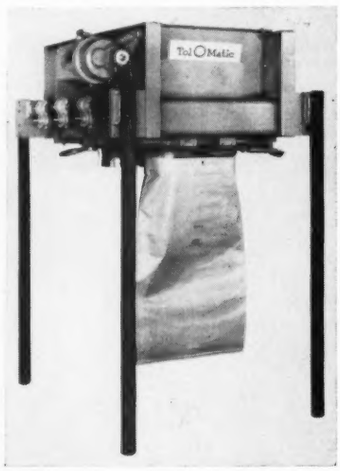
No. 9131—Back Pressure Regulator

Information on new back-pressure regulators is now available from OPW-Jordan. Models from ½"-2" sizes, suitable for pressures to 250 psi wsp and temperature to 500° F. are described. Used in industry wherever accurate control, tight shut-off and minimum maintenance are required in back pressure regulation. Easily control 50-6,600 lb. of steam per hour or 7-190 gallons of liquid a minute. Sliding Gate seats slice across flow to give balanced action. Seats are also said to be self-cleaning and self-lapping to insure tight shut-off. Com-

plete engineering information, illustrations and technical data by checking No. 9131 on coupon.

No. 9130—Bagging Device

A new automatic baler has been introduced by Tol-O-Matic, Inc. The machine, called series 50-100 "Tol-O-Matic Baler," automatically loads various products into paper baler bags or burlap shipping sacks. The machine is readily adjustable for different sizes of bags and bales. The manufacturer



claims increased production and reduced packaging costs, through the elimination of bag damage. The machine is operated by one man with no lifting, shapes the filled bag so that it slides firmly into the shipping bag, and allows easier handling, palletizing and storage. Constructed of heavy steel fabrications, the machine is pneumatically controlled. For complete decription, check No. 9130 on the coupon.

EDITOR'S NOTE

Notices of literature available on various materials, equipment and services is offered for the reader's convenience in requesting items listed on the coupon. Reader should allow sufficient time for coupon to be processed for requests to be forwarded to the supplier, and for the supplier to mail the information back to the reader.

Send me information on the items marked:

- ☐ No. 9125—Drum or Bag Filler
- ☐ No. 9126—Mobile Air Tank
- ☐ No. 9127—Vibrating Conveyor
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Issue 9/28/59

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NEWS DIGEST OF THE WEEK

Sulfuric Acid Plant Completed in Idaho

CHICAGO — Leonard Construction Co. has announced the completion and start-up of a 400-ton daily capacity sulfuric acid plant for the J. R. Simplot Co. at Pocatello, Idaho.

The new plant, designed, engineered and constructed by Leonard, uses recovered sulfur from local refineries, and Monsanto Chemical Co. vanadium sulfuric acid catalyst. The sulfuric acid is used for increased production of wet process phosphoric acid which in turn is used by Simplot for the manufacture of phosphate fertilizers. Construction was started in December, 1958.

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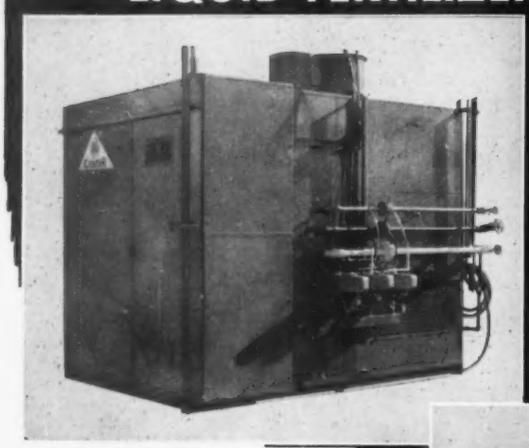
PLAN NOW FOR A PROFIT...

WITH B&L's NEUTRAL SOLUTION LIQUID FERTILIZER UNITS



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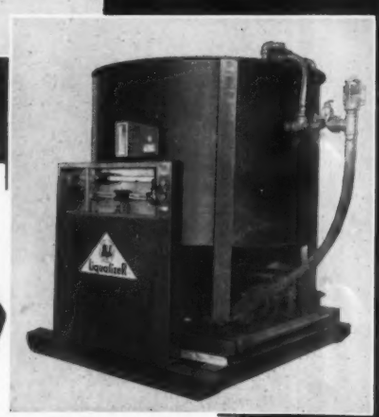
A completely factory assembled, self-contained combination ammonium phosphate and aqua ammonia conversion unit. Fully automatic and designed for long periods of continuous, uninterrupted operations.



B&L LiqualizeR

Standard or scale mounted models. Exclusive "whirlpool" action, positive total solubilization for trace elements, insecticides, herbicides, etc. "Tops in equipment" for batch type custom formulating.

PROFITS REQUIRE PLANNING; START NOW!

Step into big profit neutral solution fertilzer operations with minimum plant investment. The "B&L CoactoR" processes direct from tank cars, eliminates costly raw material storage.

The finished product is non-corrosive, neutral solution liquid mix that can be stored in inexpensive black iron tanks, and applied with low cost equipment.

You can make any of the popular ammonium phosphate liquid mix fertilizers, or produce aqueous ammonia when desired. The complete processing job is done in one fast, automatically controlled operation.

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Automatic or manually controlled liquid nitrogen "package units" for converting anhydrous ammonia to aqua ammonia.

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An exceptionally low cost batch processing unit. Features semi-automatic operation.

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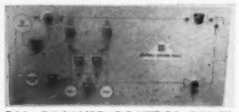
Designed specifically for converting standard batch operated plants to the proven continuous ammoniation process.



B&L GRAPHIC CONTROL PANEL
Furnished as standard equipment on the B&L AutobatcH line and provides remote control and operation of various components together with visual indication of the sequence involved.

THE B&L AutobatcH SKID PLANT
Ultimate in batch-type "complete package" units. Features the fully automatic continuous acid neutralization process.

Smith-Douglass Completes Merge with Smith Ag Chem

NORFOLK, VA. — Smith-Douglass Co., Inc., has announced that its merger with Smith Agricultural Chemical Co. was consummated and became effective on Sept. 15. As the surviving corporation, Smith-Douglass acquires additional operating plants at Columbus and Carey, Ohio; Saginaw and Holland, Mich.; and Indianapolis, Ind.

W. F. Farley, formerly president of Smith Agricultural Chemical Co., has become assistant to J. H. Culpepper, vice president of the fertilizer division of Smith-Douglass Co.

Smith-Douglass will maintain its home offices in Norfolk, Va., while Smith Agricultural Chemical Co. has been headquartered in Columbus, Ohio. S-D operates fertilizer manufacturing plants in Albert Lea, Minn.; Streator, Ill.; Wilmington and Kinston, N.C.; Danville and Norfolk, Va.; and Texas City, Texas. It mines phosphate rock at Plant City, Fla., and produces phosphorus feed supplements at both Plant City and Texas City. Natural organic nitrogen is produced in Granite City, Ill., and a second Norfolk, Va. plant. At Houston, Texas, the company has an anhydrous ammonia facility. Phosphoric and sulfuric acid and potassium silicofluoride are produced at Streator, Ill., Norfolk, Va., and Texas City, Texas.

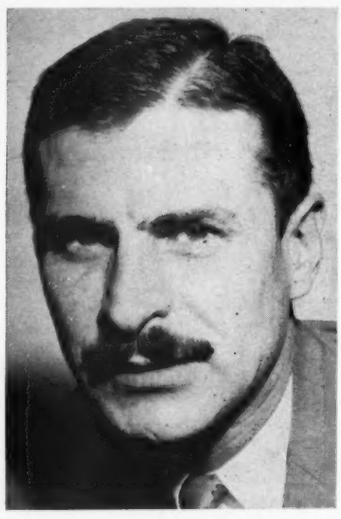
Chase Bag Announces Executive Office Move

NEW YORK—Chase Bag Co. will move its executive offices on Oct. 1 to the recently completed 22-story office building at 355 Lexington Ave., New York.

F. H. Ludington, president of Chase, announced that the new offices will provide added space to handle the increased packaging requirements of Chase customers. The firm presently maintains 14 plants and 32 sales offices throughout the country.

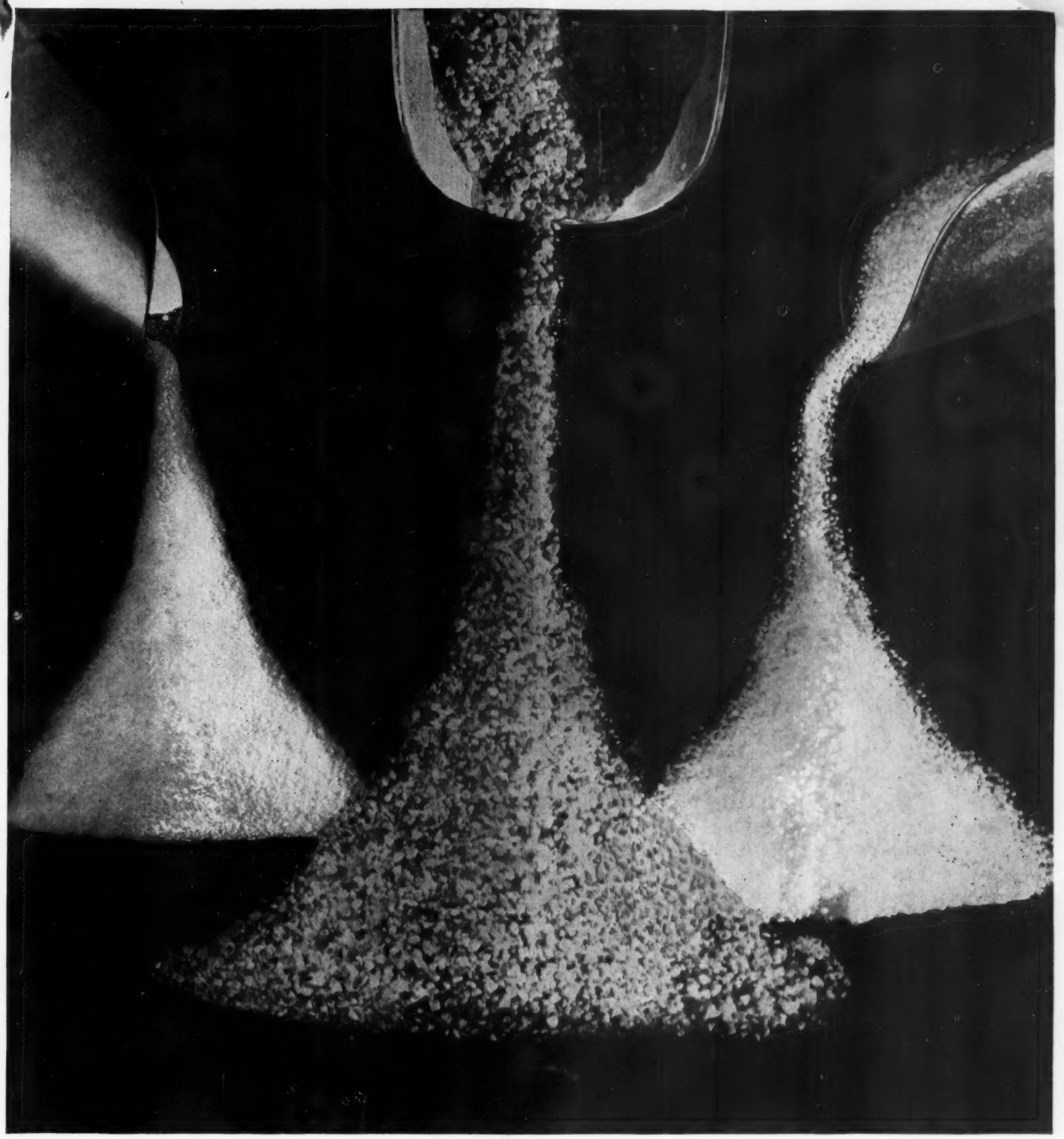
For over 25 years the Chase Bag Co. executive offices have been in the Commerce Building at 155 East 44th Street, New York. After Oct. 1 its entire headquarters staff will be at the new location, including sales personnel serving the New York territory, general sales office, purchasing, accounting, advertising and administrative departments.

The structure at 355 Lexington Avenue occupies the northwest corner of 40th Street and Lexington Ave. near Grand Central Terminal. Chase Bag will occupy the entire 13th floor and half of the 12th.

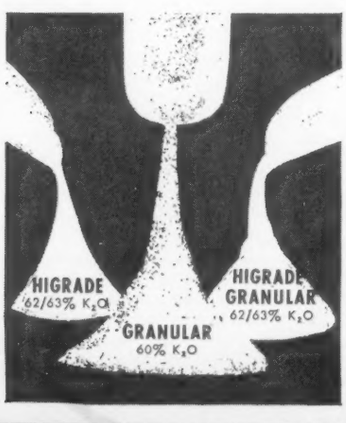


Dr. Siegfried Muessig

APPOINTED—Dr. Siegfried Muessig has been appointed chief geologist by U.S. Borax & Chemical Corp. Dr. Muessig served for eight years with the mineral deposits branch of the U.S. Geological Survey before joining U.S. Borax.



Better fertilizers begin with three grades of free-flowing USP potash



USP offers *three* outstanding grades of potash to meet the most exacting requirements of modern fertilizer production: two white grades—Higrade muriate and Higrade Granular muriate—each containing 62/63% K_2O give you more potash per ton than any other type of muriate. And USP's Granular muriate, containing 60% K_2O, is preferred where a still larger particle size is required.

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Chemical Control Problems of Fertilizer Industry to Be Aired in October Meeting

WASHINGTON—A conference on chemical control problems in the fertilizer industry will be conducted at the Shoreham Hotel, Washington, D.C., on Oct. 15, it has been announced by Dr. Vincent Sauchelli, chemical technologist, National Plant Food Institute. The event is sponsored by NPFI.

Topics on the agenda for discussion include use of samples, tolerance levels, state regulatory considerations and how management regards the role of the chemical control laboratory. Speakers represent various states, the fertilizer industry, the National Bureau of Standards, and the Tennessee Valley Authority.

The program begins promptly at 9:30 a.m., according to Dr. Sauchelli, and will adjourn at 4 p.m. Dr. Sauchelli will make the opening remarks, and W. J. Youden, National Bureau of Standards, Washington, will discuss statistical methods for chemical analysts.

The Magruder check sample statistical analysis and how to use the data will be decribed by R. M. Glocker, W. R. Grace research center, Baltimore, Md.

A four-man panel will present considerations on tolerance levels in fertilizer analyses. The panel will include F. W. Quackenbush, state chemist and seed commissioner of Indiana, Lafayette; C. H. Perrin, research chemist, Canada Packers, Ltd., Toronto, Canada; H. J. Webb, research chemist, Clemson agricultural college, Clemson, S.C.; and A. J. Duncan, Johns Hopkins University, Baltimore, Md.

"Relation of the State Regulatory Office to the Local Fertilizer Industry" is the topic chosen by R. Z. Rollins, chief of the bureau of chemistry, California State Department of Agriculture, Sacramento.

Nelson White, vice president, potash division, International Minerals & Chemical Corp., Chicago, will talk on "How Management Regards the Role of the Chemical Control Laboratory," and John Brabson, chemical development division of the Tennessee Valley Authority, Wilson Dam, Ala., is scheduled to present the final talk of the day speaking on "How Firm a Foundation."

Fertilizer industry people with responsibility for quality control and maintaining grade in plant food products are invited to attend the sessions.

$100,000 WAREHOUSE

AMORY, MISS.—A new $100,000 warehouse being constructed for the Wax Seed Co. in Amory is nearing completion and company officials said they hope to occupy the building by Oct. 1.

NAC Announces Two New Speakers on Program

WASHINGTON—Two new speakers have been added to the program of the National Agricultural Chemicals Assn. convention at French Lick, Ind., Oct. 21-23.

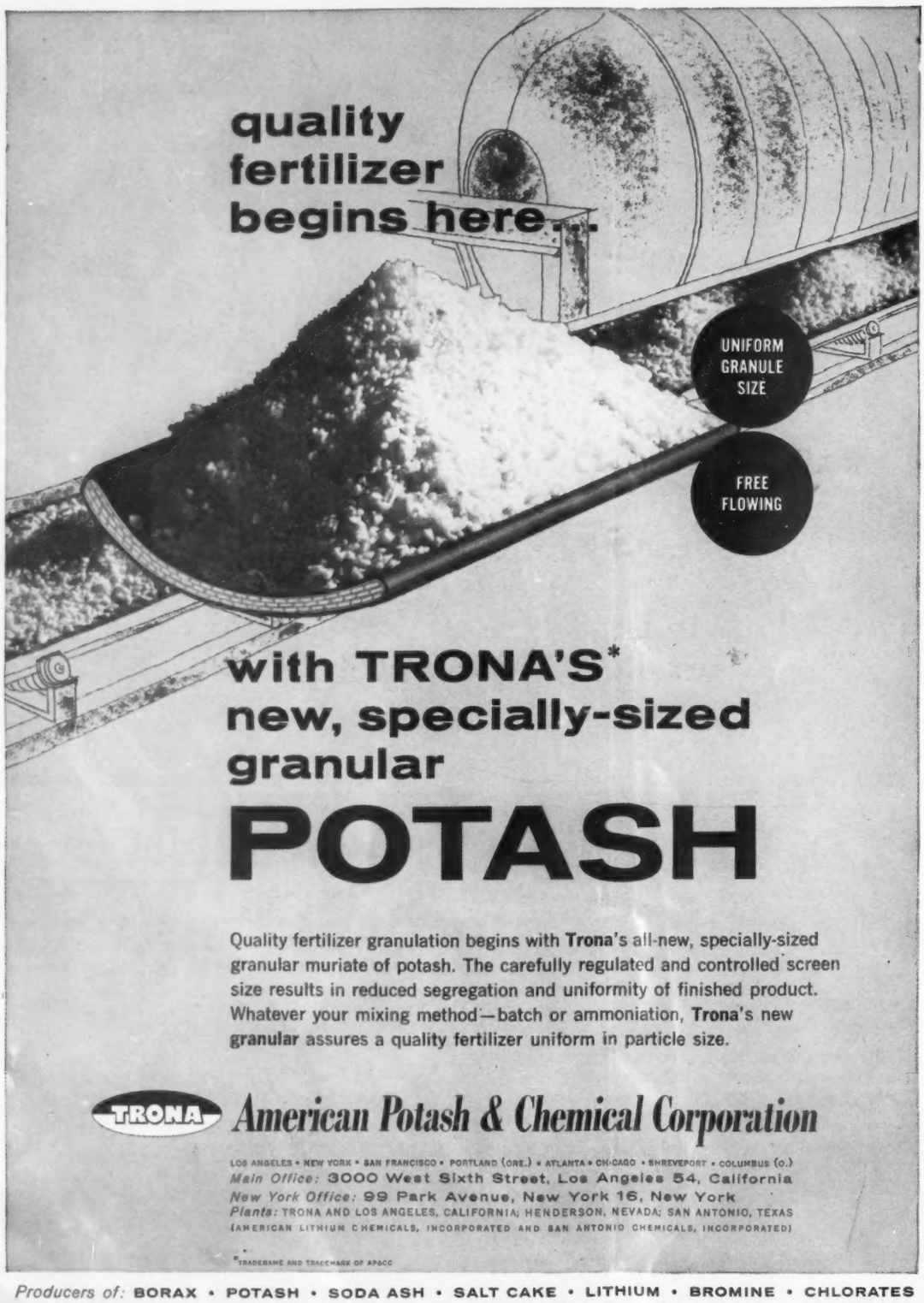
Dr. Earl L. Butz, dean of the college of agriculture, Purdue University, Lafayette, Ind., will speak at the luncheon meeting on Wednesday, Oct. 21. Dr. Butz was assistant secretary of agriculture for a number of years, resigning in 1957. He is well known in agricultural chemical circles, having participated in many industry activities.

Dr. Charles E. Palm, dean of the college of agriculture, Cornell University, Ithaca, N.Y., will talk on "World Pest Control" as part of the program of Friday, Oct. 23. Dr. Palm, long associated with pesticide industry people, has the distinction of being the first president of the Entomological Society of America. He has traveled broadly in many parts of the world and his talk will be based on personal observations gained through visits to various countries.

Two new speakers replace Sen. Everett Dirksen (R., Ill.), minority leader of the U.S. Senate, who was ordered by his physician to cancel all extra speaking engagements; and Dr. H. L. Haller, assistant to the administrator, Agricultural Research Service of the U.S. Department of Agriculture. Dr. Haller will be out of the U.S. at the time of the meeting.

OPENS NEW OFFICE

MIDLAND, MICH.—Opening of a new sales office in Johannesburg, Union of South Africa, was announced by Dow Chemical International Limited S.A. John R. Myers, area supervisor for Europe and Africa, has been named sales supervisor of the office. He has been located at Midland (Mich.) headquarters.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RAUH

Continued from page 7

the material to coat the shafts and paddles of the mixer, and conditions it to flow freely and continuously in its pellet form into and through the granulator. The pellets have no tendency to adhere to each other, but flow freely through chutes and can be screened.

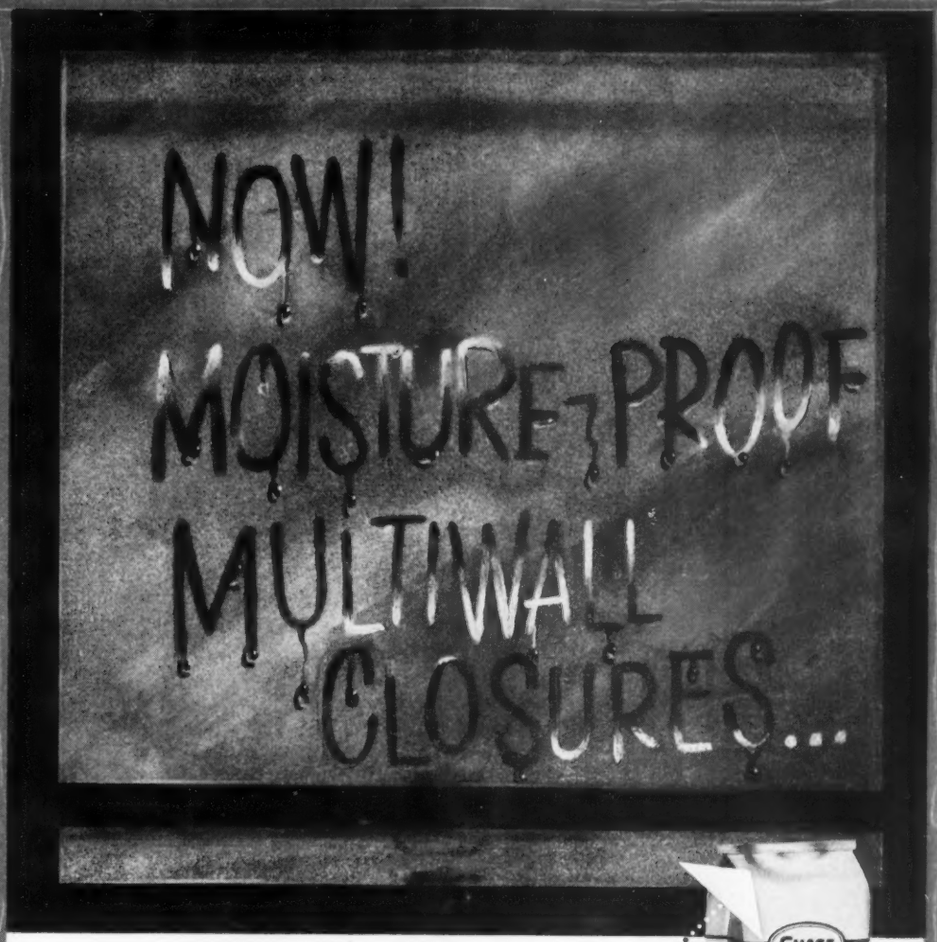
The granulator is a revolving shell equipped with a longitudinal paddle shaft. A bed of granules is built along the length of the granulator in a position so the agitator lifts the particles, cuts, rolls and aerates them during passage through it. The temperature of the material becomes 95° to 105° F., and the moisture content 6 to 13½%.

Granules emerging from the granulator are passed over a 5 mesh vibrating screen and separated into dryer feed and oversize recycle to the paddle mixer.

The dryer is a rotary, externally heated system of the louvre type, receiving hot drying gases behind the louvres, passing them up through the revolving load of granules, and discharging them through cyclone dust separators. This system lowers the moisture of the product to less than 2% without determinable loss of nitrogen, or loss of available phosphoric acid.

It then is necessary to cool this product under 105° F. to prevent reversion of the pentoxide in bulk storage, or to prevent deterioration in paper bags, if they had been bagged direct from the dryer.

Responsible for production at the Indianapolis plant are Robert Liebetrau, production superintendent, Ed W. Frietzsche, superintendent, John Rogers, chief of research and development. Rauh also has plants at Sylvania, Ohio and Plymouth, Ind.



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CHASETITE tape-over-sewn-closures

...provide a perfect TOP-AND-BOTTOM moisture barrier

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Using a special tape, adhesive, and method of application. CHASETITE closes a bag with the most positive seal known! Gives a perfect bond, even with dust particles on the tape. It is impossible to tear the CHASETITE closure off a bag without pulling part of the outer bag ply with it. Seals from tape end to tape end—firmly sealing the ends extending beyond the bag surface.

Applies at such speed that heat won't scorch paper or melt a poly-coated inner sheet! (No reduction in bag filling speed is required). Airborne moisture doesn't penetrate needle holes, ends risk of "pencil-line" hardening of material at the closure.

Contact your local Chase representative, or write today:

The stubborn problem of moisture penetration through bag closures has been licked once and for all. Now, you can specify Chase Multiwalls with CHASETITE heat-bonded tape-over-sewn *bottom* closure . . . and you can moisture-proof the *top* closure right in your own plant simply by installing the low-cost, money-saving CHASETITE unit. Your compact, new CHASETITE unit pays for itself by reducing adhesive waste, and assuring top protection against ruinous moisture pick-up. Installs on existing conveyors, needs only 2 feet board space. Prices and installation diagram on request.

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Mixing Problems Invited By Manufacturing Firm

MUNCY, PA.—Sprout, Waldron & Co. has announced it has formed a "task force" to help industry people with problems dealing with size reduction, size classification, mixing, blending, pelleting, or conveying of solids or slurries, in connection with the coming 27th Chemical Exposition to be held in New York this fall. The firm says that the group will be headed by Ken Sterrett, chief chemical engineer, and will review, analyze, and compile data on all problems submitted by Nov. 25, 1959.

Those submitting problems will be limited to people in attendance at the exposition, Sprout-Waldron says. "Pre registration problems will be researched on a first-come, first-served basis. Data will be turned over to the unit process specialist who will be on hand to discuss it further during the week of the exposition," a company spokesman said.

Operations of the "task force" will include researching the literature, studying results of laboratory and field reports, etc. Where time permits, laboratory tests may be conducted, the firm says. Special forms are available from Sprout-Waldron, Muncy, Pa., or may be described on company letterheads, it says.

New Name Adopted for Arizona Fertilizers

PHOENIX, ARIZ.—Arizona Fertilizers, Inc., has changed its name to Arizona Fertilizer & Chemical Co., according to Frank M. Feffer, Sr., president of the 29-year-old firm. He said the new name was adopted to point up the emphasis the company is beginning to place on industrial chemicals.

The organization of a subsidiary firm, Cortez Chemical Co., was also announced as the first manufacturing industrial chemical company in Arizona. Sales activities of the new wholly-owned subsidiary will be under supervision of C. Randall Duncan, Mr. Feffer stated.

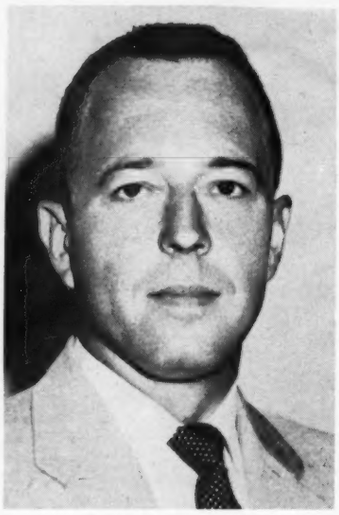
The parent firm's home office and main plant is located in Phoenix with branch plants in Yuma, Toltec and Willcox. The Cortez firm's offices will be in the parent firm headquarters.

Les Johnson, transferred to the Yuma plant a year ago from Phoenix, has been promoted to manager from superintendent, Mr. Feffer added.

New $10 Million Plant To Begin Construction

KELLOGG, IDAHO—The Bunker Hill Co., San Francisco, has announced its new fertilizer plant will be constructed here. Ultimate cost of the plant will be $10 million, it was indicated.

Construction on the plant's first unit, a phosphoric acid plant, will start immediately, John D. Bradley, president, said. He explained that this location was selected mainly because sulfuric acid was available as a by-product of the firm's zinc plant.



David D. Hunsaker

HOUGH APPOINTMENT—David D. Hunsaker has been made manager of sales development by the Frank G. Hough Co., Libertyville, Ill., maker of mobile power shovel equipment. In his new position, Mr. Hunsaker will be responsible for sales engineering, training aids, product knowledge and merchandising programs. He was formerly a district manager and has been with the Hough organization for nearly 14 years.

SAFETY

Continued from page 5

Ammonium nitrate should not be stored in any structure in which any explosives are kept.

Ammonium nitrate fertilizer should not be stored over or under any organic chemicals, inflammable liquids, corrosive acids, chlorates, permanganates and the like, finely divided metals, sulfur or combustible material other than dunnage. Storage piles should be at least thirty feet away from these materials.

It may be stored on clean concrete floors or wooden pallets or dunnage on any type of clean floor. Floor drains into which molten nitrate can run during a fire should be eliminated or plugged.

Open lights or flames should be prohibited in or near storage spaces.

To summarize: All handlers must learn the properties of the chemicals being used, use them with judgment, treat them with respect, and store them properly.

Here are some helpful hints to plant employees to help them avoid injury in their daily work. Supervisors should take time to train people on how to handle the material properly; also to teach people the properties of the material they are to handle.

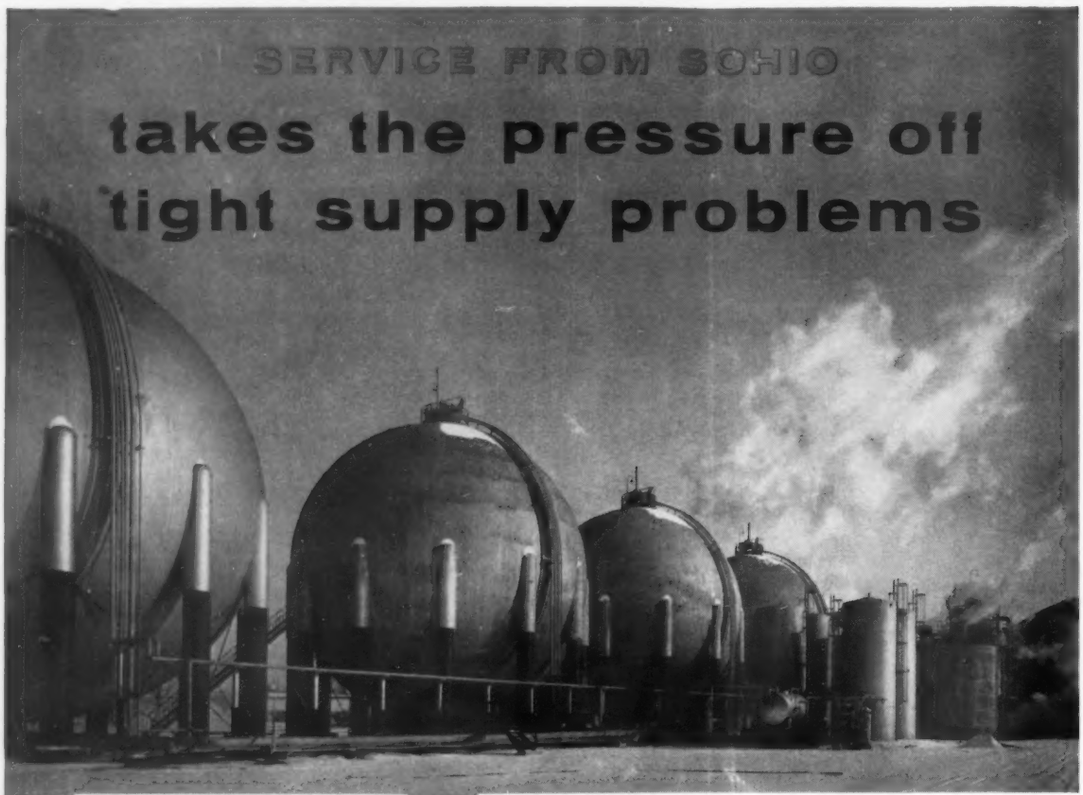
Be sure equipment operators know how to use properly and care for the equipment in question, and that the necessary safety emergency equipment is on hand. Further, be sure the personnel involved know how to use it.

Consider making X-rays on backs of men who have to do heavy lifting. A bad back can be costly. Thus, one should eliminate manual handling as much as possible. Remember good housekeeping makes all material easier and safer to handle.

Safety docks should be provided for men who have to work on top of tank cars or tank trucks. Be positive to ground electrical operated equipment permanently, if stationary, or with a grounded plug and/or rod if portable.

A check with operating departments reveals that most troubles in fertilizer handling stem from three sources. They are:

1. The men who drive the trucks seem to be uninformed about the properties of the material they are going to haul.
2. Valves on tank trucks may leak.
3. The trucks are contaminated.



Sohio's storage facilities — largest in the country in relation to production capacity — keep nitrogen materials on tap for your peak season needs.

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Sohio pioneered, and now sets new standards for speedy truck delivery of nitrogen materials.

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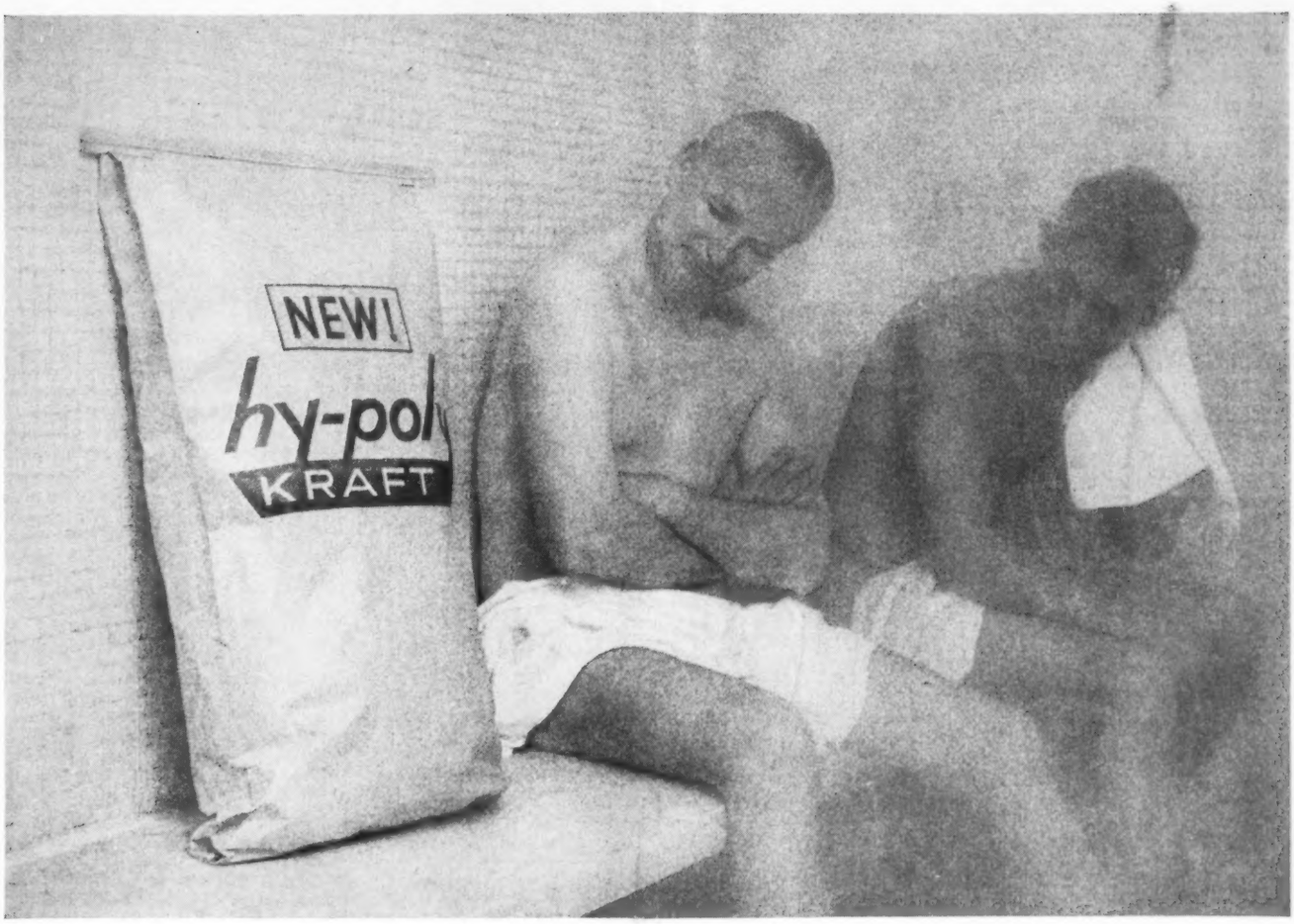

Read why new humidity-proof "Hy-poly" kraft makes medium and low-density polyethylene sheets extravagant!

THE multiwall bag you see taking a Turkish bath in our picture contains *calcium chloride*.

We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2½ times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

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That's because new Hy-poly kraft is so superior to medium and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating approximately *half as thick!*

Extensive laboratory tests prove that this dramatic new barrier sheet is superior in *every way*. Write us today for samples.

See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

PRODUCTION EDITION

Editorial

Relatively Low Wages in Fertilizer Trade May Be Hint for Plant Modernization Need

HOW MUCH do fertilizer production workers earn in comparison with other segments of the chemical industry, and with manufacturing in general? Is the wage scale moving upward, remaining static, or falling behind?

Some of these answers are seen in "Statistical Summary No. 3," a supplement to the "Chemical Statistics Handbook" compiled by the Manufacturing Chemists' Assn., Inc., based on U.S. Department of Labor figures. The supplement brings up to date information carried in the handbook.

Well, how does fertilizer workers' pay stack up with their counterparts in other chemical industries such as drugs and medicines, paints, plastics, and synthetic rubber production? The answer is that the wage scale for fertilizer workers is somewhat lower than some of the others, but is showing improvement. Between 1952 average and the May, 1958 figures, there is an increase of over 70%. However, even with this improvement, the rate is still relatively low as compared to wages received by plastics and synthetic workers, as an example. See table below:

Average Weekly Earnings, Production Workers
Selected Chemicals and Allied Products, and All Manufacturing, 1952-58*

Source: U. S. Department of Labor

Month and Year	All Manufacturing	Chemicals & Allied Products	Industrial Inorganic Chemicals	Industrial Organic Chemicals	Plastics (Exc. Synth. Rubber)	Drugs & Medicines	Paints, Pigments & Fillers	Fertilizers	Misc. Chemicals
1952, Av.	$67.97	$70.45	$77.08	$75.11	$76.31	$63.44	$71.38	$56.23	$65.35
1953, Av.	71.69	75.58	82.81	80.18	82.88	68.71	76.08	59.36	69.94
1954, Av.	71.86	78.50	86.09	83.23	83.60	72.16	77.68	61.48	71.51
1955, Av.	76.52	82.39	89.98	87.33	88.41	75.07	84.18	63.90	75.48
1956, Av.	79.99	87.14	95.35	92.89	93.66	78.55	86.11	67.68	80.38
1957, Av.	82.39	91.46	100.04	96.93	99.90	82.82	89.38	71.83	84.03
Jan.	82.41	89.21	96.93	94.94	96.56	81.60	87.54	70.22	82.42
Feb.	82.41	89.40	97.34	94.89	97.21	82.00	87.53	69.63	83.03
Mar.	82.21	89.40	97.75	95.47	98.28	82.01	87.31	70.91	82.82
Apr.	81.99	89.82	97.99	95.71	97.86	81.61	88.78	70.63	83.03
May	81.78	90.64	98.33	96.35	98.41	82.01	88.75	75.04	83.22
June	82.80	91.88	99.63	97.82	99.60	82.62	90.69	71.06	84.03
July	82.39	92.25	100.94	98.16	101.16	82.42	90.67	71.80	83.21
Aug.	82.80	92.25	101.18	98.40	101.64	81.81	91.08	71.97	83.82
Sept.	82.99	92.70	102.09	98.81	101.50	83.64	89.76	72.91	85.47
Oct.	82.56	91.84	101.50	98.33	101.99	84.05	90.13	72.14	84.82
Nov.	82.92	92.66	102.00	98.74	101.75	85.08	89.47	71.21	85.63
Dec.	82.74	93.34	104.17	99.39	100.94	85.08	89.47	72.49	86.46
*1958, Av.	83.71	94.48	104.45	100.04	103.25	85.88	93.02	74.03	87.02
Jan.	81.66	92.62	102.50	98.17	99.55	85.49	89.20	73.25	85.60
Feb.	80.64	92.57	102.66	97.44	99.80	86.11	88.98	71.10	86.22
Mar.	81.45	92.39	102.82	97.84	100.45	85.90	89.50	72.58	86.18
Apr.	80.81	92.39	102.56	98.00	99.47	85.68	89.65	73.52	86.22
May	82.04	93.43	103.38	98.98	102.18	84.85	91.58	78.41	86.40
June	83.10	94.94	104.96	100.12	102.75	86.11	95.57	72.51	87.45
July	83.50	95.06	104.60	100.69	102.31	86.71	95.91	73.44	85.54
Aug.	84.35	95.24	105.41	100.85	104.08	85.41	94.58	72.92	86.98
Sept.	85.39	95.94	107.42	102.25	105.75	85.63	94.76	75.54	86.98
Oct.	85.17	95.94	105.97	101.91	105.66	86.24	94.02	75.23	87.64
Nov.	86.58	96.82	107.01	103.07	107.70	87.29	95.76	75.29	89.10
Dec.	88.04	97.70	109.25	103.57	106.68	88.54	97.11	75.66	89.06

Of further significance also are statistics on the average hours worked each week by fertilizer industry people. In 1952, the average was 42.6 hours; in 1953 and 1954, it stood at 42.4 hours and in 1955 it crept back to 42.6. The 1956 average was 42.3.

In 1957, the average was 42.5 hours, with a high in May of 44.4 hours. The lowest number of weekly hours worked during 1957 occurred in November, with 41.4.

Hours worked each week in 1958 were lower by only a fraction of a percentage point, according to the preliminary figures. The average week's work in 1958 was 42.3 hours, with the high point being reached in May, with 44.3 hours. Low point last year

*Preliminary figures

Turn to EDITORIAL page 27

Croplife's Home Office

Croplife®
PRODUCTION EDITION

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price 25¢.

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DONALD NETH
Managing Editor

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Industry Meetings

Sept. 30-Oct. 1—Fourth Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 15—Conference on Chemical Control Problems, sponsored by NPFI, Shoreham Hotel, Washington, D.C.

Oct. 13-14—Fall meeting, Western Agricultural Chemicals Assn., Villa Motel, San Mateo, Cal.

Oct. 14-16—Pacific Northwest Plant Food Assn., annual meeting, Chinook Hotel, Yakima, Wash.

Oct. 16—Assn. of American Fertilizer Control Officials, annual meeting, Shoreham Hotel, Washington, D.C.

Oct. 16-17—American Pesticide Control Officials, annual meeting, Shoreham Hotel, Washington, D.C.

Oct. 19-20—General Session of the Fertilizer Section, National Safety Council, La Salle Hotel, Chicago.

Oct. 21-23—National Agricultural Chemicals Assn. 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind.

Oct. 29-30—Far West Fertilizer Safety School, Hacienda Motel, Fresno, Cal.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.; Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 5-6—Far West Fertilizer Safety Training School, Fresno, Cal.

Nov. 8-10—National Fertilizer Solutions Assn., annual convention, Statler Hilton Hotel, St. Louis, Mo.

Nov. 9-11—36th Annual Convention, California Fertilizer Assn., Fairmount Hotel, San Francisco, Cal.

Nov. 12-13—Southwest Fertilizer Safety School, Tropicana Motor Hotel, Pasadena, Texas.

Nov. 30-Dec. 4—27th Exposition of Chemical Industries, New York Coliseum, New York.

Dec. 2-3—Missouri State Fertilizer Conference, Columbia, Mo.

Dec. 7-10—Western Canadian and North Central Weed Control Conferences, Royal Alexandra Hotel, Winnipeg, Man., Canada.

1960

Jan. 13-15—Ninth annual convention, Agricultural Ammonia Institute, Statler Hilton Hotel, Dallas, Texas.

EDITORIAL

Continued from page 26

was July, when the average weekly hours dropped to 40.8.

One can draw all kinds of conclusions from figures such as these.

It seems noteworthy, however, that the fertilizer workman put in more hours for a smaller weekly pay average than did his counterparts in some other segments of the chemical industry. Is this a hint of what might obstruct safety programs and efficiency drives in the fertilizer industry?

Could the industry as a whole pull itself up a notch or two on the rating ladder by improving its mechanical efficiency and thus be able to hire fewer but more responsible workmen?

Output per man must increase first. And this can be accomplished only by taking advantage of modern equipment for materials handling, mixing and bagging operations to cut down waste motions and inefficiency in the plant.

Competitive pressures demand more efficiency in the industry, and the wage-hour figures reveal the area in which most of the need lies.

BRUSH AND WEED KILLER—KILL SUBMERSED water weeds which foul up motor propellers, tangle fishing gear and choke irrigation ditches with R-H Granular Weed Rhap. Inexpensive, easy to use, sure results. For details write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

KILL BRUSH at low cost with amazing R-H Brush Rhap. Will not injure grasses, grains, cattle, or other animals. See your dealer, or write Reasor-Hill Corporation, Box 36CL, Jacksonville, Ark.

NEW WORKS MANAGER

MILWAUKEE—Russell A. Hedden has been appointed works manager of manufacturing at Allis-Chalmers' West Allis (Wis.) works, according to an announcement from the Milwaukee firm. He succeeds E. W. Bonness who has been named consultant to the director of manufacturing, industries group.

amazing new discovery!

Now a new, low cost, stable, powerful lemon odor for masking pesticides, herbicides and fertilizers.

Write for free samples to:

P. ROBERTET, INC., Dept. A, 221 Fourth Ave., New York 3

Quality products since 1850

CALENDAR FOR 1959-60

SEPTEMBER

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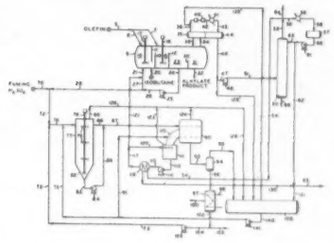
PATENTS

Continued from page 9

tion in respect of at least the gamma isomer, continuously introducing the metastable supersaturated solution into the lower portion of a crystallization vessel containing a large surface of gamma crystals, the rate of introduction of said metastable supersaturated solution into said vessel being such as to maintain crystals in said vessel in suspension and classify said crystals while substantially isothermal crystallization takes place therein, removing spent solution and relatively fine crystals from the upper portion of said vessel, and removing relatively coarse crystals of separated gamma isomer from the lower portion of said vessel.

2,903,339

Sulfuric Acid Purification. Patent issued Sept. 8, 1959, to Samuel R. Stiles, Cresskill, N.J., assignor to M. W. Kellogg Co., Jersey City, N.J.



In a process in which spent sulfuric acid is crystallized in a crystallization zone to produce a product comprising mother liquor and crystals of sulfuric acid and in which said product is withdrawn from said crystallization zone, the method for preventing the agglomeration of said crystals which comprises injecting a portion of the product thus withdrawn into said crystallization zone at a linear velocity of at least 50 feet per second to prevent agglomeration of the crystals.

V-C Plans 1960 Expansion Program

RICHMOND, VA.—Virginia-Carolina Chemical Corp. looks to 1960 to mark an expansion in fertilizer production unparalleled in recent years. The firm has already broken ground in Nichols, Fla., for the expansion of its concentrated superphosphate facilities and a new sulfuric acid plant with a capacity of 600 tons a day.

This expansion will boost V-C's production of concentrated superphosphate by 150,000 tons a year. Company officials say the expansion will enable V-C to meet demand for more and higher analysis fertilizers, and for concentrated superphosphate in the midwest and abroad.

The new installation, scheduled for completion by June, 1960, is designed to utilize either low grade or high grade phosphate rock. It will be constructed adjacent to existing facilities.

Meanwhile, construction is well under way on a new V-C fertilizer plant in Jasonville, Ind. It is expected to be operating by Jan. 1 with an approximate production capacity of 25,000 tons.

When completed, this timber frame, T-shaped structure will be 390 feet long and 105 feet wide at the top of the "T" and 120 x 90 at the tail. It will have 51,750 square feet of floor area.

Shipping facilities will be provided for both bag and bulk customers, and truck weighing scales will be installed especially for the latter.

The plant will produce all the analyses of semi-granular fertilizers needed by farmers in southeastern Indiana and parts of southeastern Illinois.

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge $2.25. Situations wanted, 10¢ a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $11 per column inch.

All Want Ads cash with order.

MACHINERY FOR SALE

FOR SALE—ST. REGIS BAGGING MAchine No. 327. Barber-Greene conveyor, 25 ft. long. Welcome Agricultural Chemical Co., Welcome, Minn.

HELP WANTED

WANTED—MANAGER FOR LARGE FERtilizer plant, north Midwest area. Plant is large granulation plant with superphosphate facilities. Give complete resume of age, education, experience and availability in first letter. Address Ad No. 5238, Croplife, Minneapolis 40, Minn.

Henry Valve Company To Expand Facilities

MELROSE PARK, ILL.—Purchase of the neighboring property and building was announced by Charles V. Gary, general manager of Henry Valve Co., located in Melrose Park, a suburb of Chicago.

The acquisition of the modern building, land and parking facilities to the west of its present home office and factory will represent a gain in excess of 40% of Henry Valve's existing facilities.

These new facilities will provide additional space for employee parking and storage of raw materials, purchased parts, as well as sub-assemblies and finished products. This will permit increased production by releasing existing storage areas for that purpose.

Collier Takes Option on 300 Acres for Expansion

LOS ANGELES—Collier Carbon and Chemical Corp. has announced that it has taken an option on about 300 acres of land in Contra Costa County near Rodeo, Cal.

A spokesman for the company said that Collier plans to use the site for future expansion of its carbon and petro-chemical production facilities.

The acreage is a part of one of early California's Spanish land grants.

INDEX OF ADVERTISERS

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Allied Chemical Corp., Nitrogen Div. 13-16
American Potash & Chemical Corp. 22
Barnard & Leas Mfg. Co., Inc..... 20
Bemis Bro. Bag Co. 10, 11
Broyhill Company, The 8
Chase Bag Co. 23
Davison Chemical Co. 5
Hough, Frank G., Co. 6
International Paper Co. 25
Kraft Bag Corp. 9
Minneapolis Sewing Machine Co. 4
Phelps-Dodge Refining Co. 12
Progressive Farmer 3
Power Curve Conveyor 17
Reasor-Hill Corp. 27
Robertet, P. 27
Sohio Chemical Co. 24
Standard Oil Co. 28
Texaco, Inc. 8
U. S. Phosphoric Products Division 19
U. S. Potash Co. 21

DO YOU BUY ANHYDROUS AMMONIA OR NITROGEN SOLUTIONS?

Meet Ray Funk

Ray Funk is one of the men who have helped build Standard Oil's reputation for delivering NH_3 and Nitrogen Solutions on time and when promised. Working through Standard's traffic department shipments are expedited and followed closely to assure delivery. Ray's knowledge of such things as when the tank car will leave the area and the number of lines handling are what assure you that the car you've ordered will be coming onto your siding when it is due.

Ray keeps a running record of tank cars available, and he knows accurately the schedule of truck shipments. He is thus able to help customers estimate the delivery time on NH_3 and Nitrogen Solutions shipped by truck.

You don't learn this job overnight. Certainly Ray didn't. He's been in the Standard Oil sales department for 22 years. Thirteen of these years have been in customer service work. Many's the time Ray has been on the telephone at home after midnight making sure someone's shipment went through on time.

Is this the attention you would like your purchases of Anhydrous Ammonia and Nitrogen Solutions to receive? Well, it's the kind of care your order gets at Standard. Get all of the facts from your Standard Oil representative. Or write, **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.**

You expect more from **STANDARD** *and you get it!*